The Electrical Industry's Weekly Magazine

August 27, 1956

Electrical World

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Electrical World Conference Finds . . .

Fly Ash Demand May Exceed Supply

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Second Commercial Cooking Survey . . . . page 36

E B POWER
UNIVERSITY MICROFILMS I
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GS W 1

NEW COMPUTER makes possible solution of complex turbine-generator engineering problems which were unsolvable employing earlier calculating methods. Here, shown in General Electric's Large Steam Turbine-Generator Engineering Calculations Center, H. N. Cantrell, A. W. Rankin and Ruth E. Callaghan examine turbine bucket "program" results computed by the new IBM 704.

Use of new computer makes possible . . .

New horizons in turbine-generator design

Installation of the first IBM 704 computer for exclusively non-defense private industry use is speeding major advances in turbine-generator design and construction. The new computer, now in full-time operation at General Electric's Large Steam Turbine-Generator Department in Schenectady, is one of the most advanced computers currently available for engineering and scientific calculations.

VARIED APPLICATIONS

The new computer permits the solution of complex engineering problems otherwise unsolvable by previous methods. Some of the problems presently being processed include new design calculations of low-pressure turbine components; bucket and turbine rotor vibration frequencies; and generator electrical and ventilation designs. In addition, it will soon be used to obtain turbine cycle heat balances and heat rates, thus making this type of data available in a much shorter period of time than is currently possible.

Extensive use of the new 704, with its ability to make a larger number of calculations in solving problems, is helping engineers to achieve optimum turbine-generator design more readily, thus engineers and designers have more time for creative thinking and the development of new designs.

PROMISES SIGNIFICANT DESIGN SOLUTIONS

This application of the 704 computer marks a significant contribution to the development of larger turbine-generators which will offer even greater efficiencies to help electric utilities economically meet spiralling load growth. And, other advanced types of computation devices are at work throughout General Electric, helping to speed refinements in G.E.'s full range of apparatus for the electric utility industry. For further details, contact your nearest General Electric Apparatus Sales Representative. General Electric Company, Schenectady 5, N. Y.

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Electrical World

Published for 82 years for those engaged in the business of generating, transmitting, distributing, or supplying electric power

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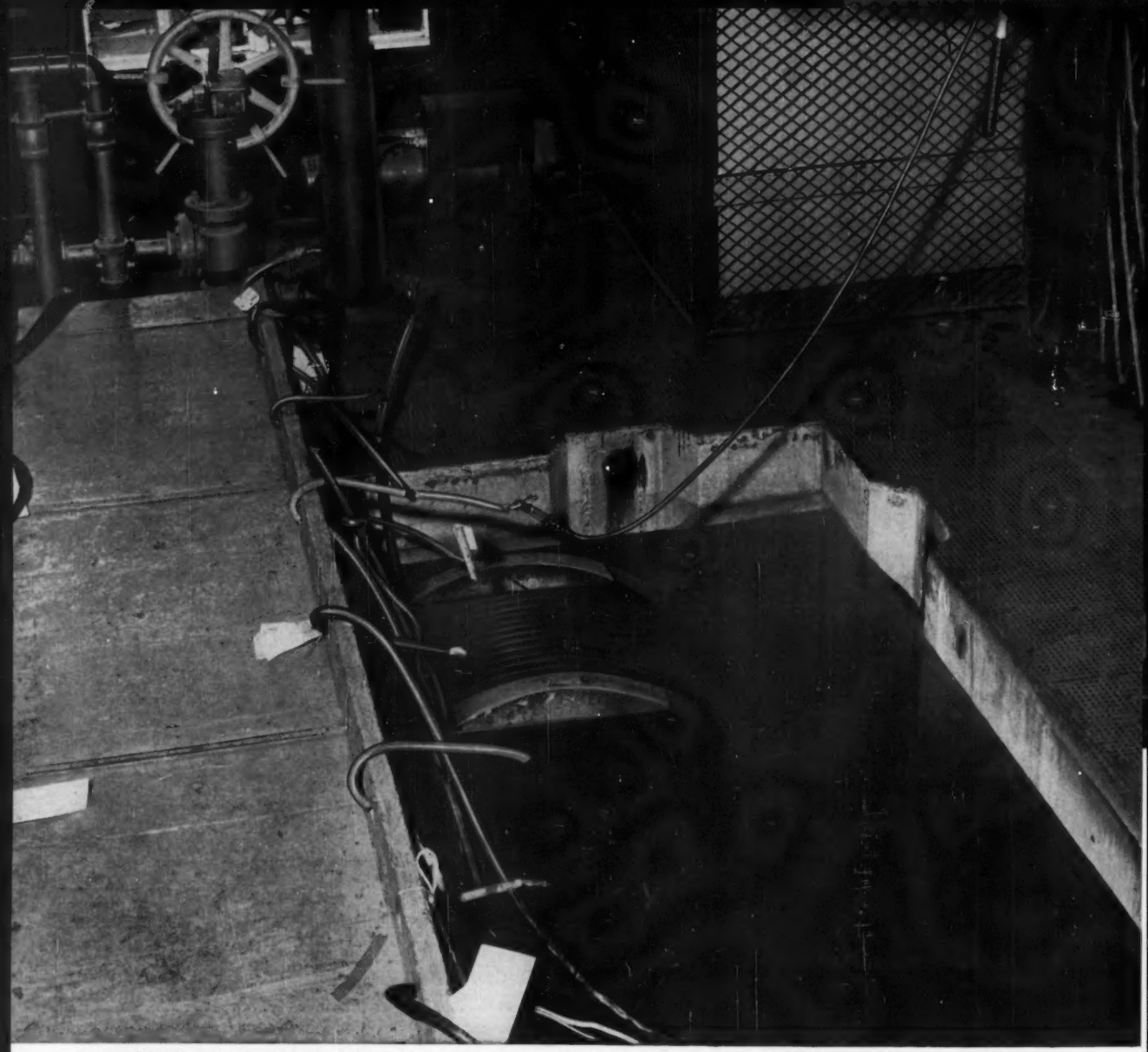
COMING NEXT WEEK—Area development is growing in importance as an activity of electric companies. This will be discussed on the basis of material submitted by the EEI Area Development Committee.



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EDITORIALS

Fly Ash Changes from Liability to Asset

There can no longer be any question that fly ash has a big and promising future as a usable byproduct of the power generation process. Today, largely through the research efforts of a few enterprising utilities, manufacturers, and others, the usefulness of fly ash is recognized as an engineering material that can add quality to and reduce the costs of roads and massive concrete structures.

Evidence of this recognition is the two fly ash specifications that have been adopted by the American Society for Testing Materials. One is a tentative specification for fly ash as an admixture for portland cement concrete. The other is a tentative method of test for fly ash as an admixture for portland cement concrete. In addition ASTM today also accepts fly ash as a pozzolan in cement.

This technical recognition is being currently reflected in growing interest in fly ash for at least five commercial applications:

1. As a pozzolanic additive with portland cement to make a superior concrete.
2. As a filler in bituminous compositions used in paving.
3. As a substitute for the argillacious component in making cement itself.
4. As a lightweight aggregate in sintered form in concrete and cinder blocks.
5. As a high mineral content filler material in fertilizer.

The potential commercial market for fly ash applications in building and maintaining roads and highways, alone, has been set at an estimated 17½ million tons annually—just in today's fly ash producing states. This potential use is fully three times the amount of fly ash produced today in these same states. Add to this the use of fly ash in such recent mass concrete projects as the bridge over the Straits of Mackinac, the Mobile Bay Bridge, Liberty Dam near Baltimore and Hoover Dam near Columbus, Ohio, and it becomes immediately apparent that the potential market—when fully developed—can easily outrun the supply.

These facts were clearly demonstrated at the conference on the utilization and sale of fly ash which was held last month at Pittsburgh under the auspices of Electrical World. What was said in detail at this conference is reported on page 16 of this issue.

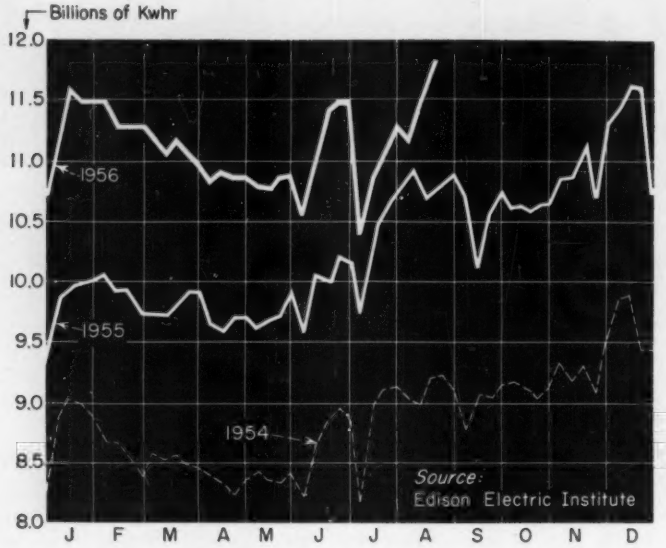
One fact was made startlingly clear by all speakers: That despite the tremendous commercial possibilities of fly ash—and the opportunities that exist to offset the cost of its disposal as a waste byproduct of power generation—the full burden of research and development is still being borne by only a few companies.

If the utility industry is to profit by these opportunities, if the tremendous market for this new and useful material is to be developed, more companies must participate in its commercialization.

Two things need to be done: Utilities must act to get fly ash approved and specified for local projects, and utilities should specify fly ash in their own construction to provide dramatic evidence of its advantages and economies.

If these actions are taken, the magnificent potentialities of this new engineering material will be promptly and effectively realized, cost of engineering structures reduced, and a new source of revenue tapped by the utility industry.

ELECTRICAL WEEK



OUTPUT

Week ended Aug. 18
11,794,000,000 Kwhr
Up 9.1 %

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 8.0%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Aug. 18	+9.1	+11.0	+5.2	+8.8	+11.8	+6.2	+24.7	+15.3	+6.1	+5.2
Aug. 11	+7.5	+7.4	+3.3	+7.6	+12.5	+5.9	+15.1	+15.8	+6.1	+4.2
Aug. 4	+2.4	+3.3	−4.8	−3.1	−1.2	+5.7	+14.4	+14.1	+11.5	+3.5

Seasonally Adjusted Index 222.5 Week Ago 217.7 Year Ago 204.2

Here are the issue's highlights . . . NARUC looks ahead to heavy atom-plant responsibilities regarding safety standards . . . Russia's Malenkov tells McGraw-Hill publisher that two Arctic rivers will be reversed to generate 11-billion kwhr a year . . . Democrats and Republicans both claim sweeping honors for natural resources policies, and both like preference clause . . .

Holyoke Water Power fixing eccentric generator shaft on spot with employee-devised tool . . . TVA creates quick emergency shutdown system for old hydro plant . . . Demand for fly ash may beat supply . . . EW's second commercial electric cooking survey shows the pot's boiling faster . . . Preference clause debated hotly at Montana water resources conference . . . EEI's round table on labor plans to spearhead attack on tomorrow's problems . . . Pictorial glimpses of recent news at Niagara, Vancouver, and Jenkins Township.

With a tightening of the money market, leading banks across the U.S. raised the prime interest rate from 3¾ to 4%. There were also increases in rates on bankers acceptances and on loans to brokers and dealers. These increases in money rates touched off speculation that the Federal Reserve Board would raise the discount rate. **Outlook: Still higher money costs are possible.**

Electric power plants consumed 20% more coal in 1955 than in 1954, according to National Coal Association. Power production in 1955 used 136.6-million tons of coal while the coal price dropped 3.8% on an "as consumed" basis.

Adequate world copper supplies at "present prices" for next five years are predicted by Roy H. Glover, chairman of Anaconda. Thereafter, he says, the question facing the copper market is going to be "how can production be increased adequately to meet the ever-increasing demand caused by new technologies and applications and ever-increasing populations."

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . Federal Power Commission recesses until Sept. 24 its hearings on Pacific Northwest Power's proposed 1,183,000-kw Mountain Sheep-Pleasant Valley project on Snake River. Then, Kinsey Robinson, president of Washington Water Power and PNP, will be cross-examined by counsel for intervening public power groups . . . Army Corps of Engineers gets go-ahead signal to make $3-million Passamaquoddy Bay tidal-power study . . .

Atomic Energy Commission invites proposals from colleges and universities to establish and conduct courses in nuclear reactor technology. The bid is part of a program to double the number of nuclear reactor engineers trained each year at Oak Ridge School of Reactor Terminology (ORSORT). Number of students enrolled in the September ORSORT course has been increased from 90 to 120, the maximum that can be handled with present facilities.

Governor Griffin of Georgia creates a 30-member State Nuclear Energy Advisory Commission. Five divisions of the group are: Atomic power, industrial applications, agriculture, manpower and education, medicine and health.

Eleven industrial firms are seeking to enlarge the $1,366,156 rate cut that the state PUC ordered Pennsylvania P&L to put into effect. Attorneys for the firms filed a petition with PUC claiming PP&L's rates were excessive by $5,157,184. The firms also contend that these excessive revenues should be given exclusively or in part to the industrial and commercial users.

NIAGARA CONTROVERSY RAGES ON

A court test seems in prospect now that New York State Power Authority has filed with Federal Power Commission an application to develop the hydro potential of Niagara River. By its application the authority seeks to by-pass Congress and break a six-year deadlock on the Niagara issue. A Senate reservation in the 1950 treaty between U.S. and Canada gave Congress the right to designate the developer of Niagara. Regardless of FPC's decision on this application, it will probably touch off a court fight to test the validity of the treaty reservation.

And there were political repercussions when Robert Moses, chairman of the Power Authority, filed his application with FPC. He proposed to assure 750,000 kw to Niagara Mohawk Power until year 2000. This is in return for rights to the 32,500 cfs that the utility used to produce 365,000 kw before its Schoellkopf Plant collapsed. Moses's over-all development would cost $566 million and would produce 2.2-million kw.

But Moses's proposed "concessions" to Niagara Mohawk drew fire from Governor Harriman who declared that he doesn't approve the application "in its present form." He sided with another authority trustee who contended that by promising to deliver 750,000 kw to the utility until 2000 "the hands of the governor have been tied." Under its license which expires in 1971, Niagara Mohawk could develop a maximum of 365,000 kw.

This controversy in New York, however, does not in any way imply a division of opinion on whether the state should seek to develop Niagara and, if necessary, try to by-pass Congress to do it. **The point in disagreement** is whether it was necessary to promise Niagara Mohawk anything for relinquishing its rights.

Utility Commissioners Look Ahead to

'Fear psychology' seen at NARUC meeting, as well as reactor obsolescence that will affect rates and dividends. Other highlights are: Federal intrusions on states rights may be eliminated, a rate-of-return allowance above cost of capital is needed to offset attrition of inflation . . .

Feinberg: A Far Thinker

Vance: No Repressive Rules

Keeping abreast of current conditions in the electric industry with an eye on the future, the National Association of Railroad & Utilities Commissioners devoted much of its recent 68th annual convention, San Francisco, to:

- Influence of nuclear power on regulatory bodies.
- Cost of capital related to rate of return.
- Treatment of accelerated depreciation.
- Attrition of rate of return.
- Overhauling electric system of accounts.

Influence of nuclear power on regulatory bodies was underscored by NARUC President Benjamin F. Feinberg, chairman, New York PSC. It is not too soon to begin long-range thinking about regulatory policies for protection of the public. In the public mind, he said, there is a fear psychology associated with atomic plants, although the risk is greatly magnified. Utility management, regulatory bodies, and governmental agencies must cooperate to develop safety standards.

Nuclear Rates Seen As Problem

The public has vast misconceptions as to rates for nuclear power, Feinberg said. Yet there is not even the basis for a reasonable guess as to what rates will be. The distinct possibility of rapid obsolescence of nuclear reactors will introduce the problem of how the ratepayer and the stockholder should share in this expense.

Tensions brought on by attempted federal invasions of state rights in the regulatory field have lessened and such conflicts may be eliminated entirely, Feinberg said hopefully. But Supreme Court rulings (Jersey Central *vs* FPC, 319 US 61; and Connecticut Light & Power Co *vs* FPC, 324 US 515) have placed certain intrastate electric companies under FPC jurisdiction. Therefore, new statutes are needed to eliminate dual regulation and to preserve state regulation over local utilities.

Potentialities of nuclear reactors for power production are strengthened by remarkable operating record of the pressurized-water reactor in the submarine Nautilus, said Harold S. Vance, Atomic Energy Commission. Operating for over 1½ years on its original fuel charge, the Nautilus has cruised more than 40,000 miles and may go at least another 25,000 miles before refueling. Vance viewed the possibility of a nuclear reactor catastrophe affecting the general public as being extremely remote. Reactors operated by AEC have recorded over 70 years of actual operating time without an accident or serious consequence.

Best Reactor Type Not Yet Found

Vance was quick to say that, as yet, no single reactor type warrants concentration on it as the best prospect for competitive commercial power. There are technical problems yet to be solved before we can build truly competitive nuclear power plants. Vance added that time required for design and construction of commercial plants will provide regulatory bodies with an opportunity to establish regulations which will protect the public and yet not be repressive.

Attraction of capital, maintenance of credit and financial integrity, and return to equity owners commensurate with risks all establish the significance of the cost of capital approach to a fair rate of return. These criteria were laid down, said P. M. Schuchart, Florida PUC, by the Supreme Court in the Bluefield and Hope cases. There is no mathematical formula which can correctly assess and reflect all the variable factors associated with this approach. Furthermore, the cost of capital approach is but one useful factor in arriving at a regulatory result. Schuchart suggested that a specific allowance in the rate of return, above the cost of capital, is needed to offset attrition of inflation.

Basic considerations which underlie both a reasonable return and the annual cost of capital are so closely related as to make the cost of capital approach a meaningful tool in setting a reasonable return, said Thomas Hancock, Michigan PSC. His commission places considerable reliance on cost of capital data in setting earnings requirements. But by emphasizing the dollar aspect of earnings required to compensate investors, the commission avoids the problems of the traditional approach. This latter theory wrongfully applies a cost-of-capital percentage to an earning base with which it is not logically connected.

Although our commission considers

Heavy Atom-Plant Responsibilities

cost of capital in its determinations, said Freyman Coleman, California PUC, it has not accepted the earnings-price ratio as a finalizing figure. And it seems quite possible that with the "cost of capital" theory, continuous rate adjustments would be in order.

In considering accelerated depreciation from an accounting standpoint, commissions in 23 states, in all but two cases, have found that normalized taxes should be used in determining earnings. This was reported by the NARUC committee on evaluation. The commissions also have found that the tax reduction should be treated as a deferral by setting it aside in a tax reserve or restricted surplus account. This action, notes the evaluation committee, seems to meet the intent of Congress of providing capital for expansion.

Attrition Solutions Sought

Attrition—the tendency of rate of return to diminish as new plant is added at current cost levels—may well become a serious consideration if demand continues to grow at the present amazing rate. This factor, reported the NARUC committee on rates, is causing utility management very serious problems in choosing between substantial investment for more efficient plants or slightly increased operating expense. In recognizing the effects of attrition, commissions have adopted year-end investment figures or have increased the rate of return, arbitrarily or by formula. Commissions have encouraged utilities to present their cases on the basis of a future year to reflect the future investment problem. Another method is to include plant being built in the rate base.

Recent Supreme Court decisions in the Mobile and Sierra cases have upheld the power of a utility to bind itself by special contract for service at a special rate. The decisions hold that such a contract can not be abrogated by the unilateral action of the utility in filing a superseding rate.

The committee recommended that state commissions review local statutes to insure that some jurisdiction over special contracts is retained locally. Otherwise, reasonable control over rates cannot be exercised except by taking refuge in the highly debatable exception in the Sierra case as "an adverse affect on the public interest".

Long-term Pacts Deemed Risky

In an era of shifting economic standards, the feasibility of a utility binding itself immutably by a long-term rate is questionable, the committee said. In a subsequent rate case the commission should not be bound to accept a contract which results in less than a fair return, as inseparable from the other operations of the utility, with the result that the balance of its customers are penalized. This point should be made clear by statute. It would seem that a special contract could and should be reviewed at some future time by the regulatory agency to determine whether its effect is unreasonably discriminatory, even though it may have been quite defensible at its inception.

There is an urgent need for overhauling and coordinating the system of accounts, said the NARUC committee on accounts and statistics. Utility accounting for the past 20 years has not kept pace with the dynamic changes which have occurred in utility operations. Specifically, reported the committee, the water system of accounts needs revision and water companies agree that changes must be made. But, these changes will conflict with the present electric system, and there are many joint water and electric utilities. Furthermore, the electric system of accounts contains expense classifications no longer needed and substantial simplifications can be effected.

Regulatory bodies should expect, and demand if necessary, that utilities meet any reasonable demand for service, continue to improve existing services, become leaders in research and development, and be soundly managed. This opinion was voiced by H. Lester Hooker, Virginia SCC. Regulators must take a balanced view toward stimulation of utility expansion and innovation rather than to prices and profits alone, Hooker added.

Needed Rate Boosts Justifiable

Where rate increases are necessary, said Robert L. Moulton, Ohio PUC, they can be justified before the public if the utility will take the time and effort to explain the facts to the consumer. Regulatory bodies must assume the role of "public protector" in proceedings before them, federal commissions, and the courts to provide complete consumer protection, stated Aaron L. Jacoby, New York PSC.

USSR to Reverse 2 Rivers

Soviet Russia is confident that its engineers can reverse the flow of two Arctic rivers so that an additional 11 billion kwhr of hydroelectric power can be developed. This was reported by Shelton Fisher, publisher of McGraw-Hill's Power magazine, upon his return from an interview with Georgi M. Malenkov, former Soviet premier.

Under the proposal, the Pechora and Vychegda Rivers would be reversed and their streams turned into the Sukhona which in turn would feed the Volga. Although the Russians earlier claimed that atomic energy would enable them to move mountains (from which the first two rivers spring), no mention was made of actual plans to use nuclear energy in construction of the project. A series of locks and pumps might afford a more practical engineering scheme, but Fisher said that he was given no actual details regarding the way the Russians intend to reverse the rivers' flows.

Now minister of electric power stations, Malenkov told Fisher that plans for the project are already on engineering drafting boards. If this project is a success, it is thought that it may lead to even more staggering undertakings—such as the reversal of Siberian Rivers Irtysh, Ob, and Yenisei, which would then irrigate the deserts of Central Asia.

Malenkov outlined the Soviet program for construction of nuclear power plants too: Eight stations are to be built by 1960 with 2.5 million kw rated capacity. Each plant is to have a different type of reactor so that a maximum of experimental and operational data may be obtained, Fisher reported.

Dems, GOP Claim Resource Laurels

- **Democrats praise 84th Congress for building upon natural resource policies of Roosevelt and Truman, blast Eisenhower Administration for a 'faithless performance'**

- **Republicans proclaim present water resource programs the 'greatest this nation has ever seen', list party's accomplishments, defend partnership policy**

The platform committees of both political parties have laid claim to credit for natural resources accomplishments of the 84th Congress.

In Chicago the Democrats asserted that they had built upon the conservation achievements of both Roosevelt and Truman by "undertaking the greatest program of natural resources development ever assumed by any Congress in our nation's history."

A week later in San Francisco a GOP platform committee, headed by Sen Prescott Bush of Connecticut, boasted that the Eisenhower Administration "already had ushered in one of the greatest water resource development programs this nation has ever seen, a soundly conceived construction program that will continue throughout this century and beyond."

GOP Lists Accomplishments

The GOP natural resources plank, which had been prepared by a subcommittee headed by Sen Arthur W. Watkins of Utah, went on to list the GOP accomplishments—among them: St. Lawrence Seaway and power project, Colorado River storage project, Great Lakes connecting channels, small watershed protection and flood prevention under local control, expansion of small project developments for flood control, navigation and reclamation, and advanced partnership water resource developments in a number of states.

The Democrats took blanket credit for these and went on to categorize the Eisenhower Administration as "a faithless performance" which "has despoiled future generations of their heritage" by failure to safeguard natural resources.

The Republican plank had nothing to say about the Dixon-Yates contract, the Al Sarena timber mining scheme, and the low level Hells Canyon Dam, all of which are sure to become oft-bandied issues in public power areas such as Oregon, Washington, Idaho, and Montana. But the Republicans did defend their often-criticized partnership policy, which the Democrats failed to mention in their platform. They said, in part:

"We recognize that the burgeoning growth of our nation requires a combination of federal, state, and local water and power development—a real partnership of effort by all parties.

"We commend the Eisenhower Administration for encouraging state and local governments, public agencies, and regulated private enterprise, to participate actively in comprehensive water and power development. In such partnership we are leading the way with great federal developments such as the Upper Colorado project and with partnership projects of great importance—some shelved by the Democratic 84th Congress."

The Democrats claimed the Republicans had done their share of shelving programs, including the research for the development of synthetic liquid fuel from coal and shale, and had lapsed a project launched by the Democrats to develop fresh water from salt water.

In San Francisco, Interior Secretary Fred A. Seaton told Electrical World that neither program had been allowed to lapse under the Eisenhower Administration. The synthetic liquid fuel research has been returned to the Navy, while the fresh water from sea water is continuing, Seaton said.

Both platforms pledged support of the preference clause:

Democrat: "We shall once more rigorously enforce the anti-monopoly and public body preference clauses, including the Holding Company Act . . ."

Republican: "In the marketing of federally produced power, we support preference to public bodies and co-operatives" under Congressional policy.

On atomic energy, which the Democrats had taken credit for developing, the Republicans pledged continued, vigorous development, both for defense and peaceful purposes.

The Republicans asserted that their partnership policy already has been applied successfully to atomic power: "The government and private enterprise are working together on a number of large-scale projects designed to develop substantial quantities of electric power from atomic sources. The first power reactor will be completed next year. More and more private funds are being invested as government monopoly is relaxed.

"In relaxing its monopoly," the GOP platform continued, "government can stimulate private enterprise to go ahead by taking recognition of the tremendous risks involved and the complexity of the many technical problems that will arise, and assist in those ways that will make advances possible."

The GOP platform also claimed that the Atomic Energy Commission is encouraging a vigorous rural electrification program by cooperatives.

The Democratic platform pledged the party to restore "non-partisan administration of the AEC," to accelerate the domestic civilian atomic power program by construction of a variety of demonstration prototype reactors, to increase the production of fissionable material for peaceful stockpile commitments, and to conduct a "comprehensive survey of radiation hazards from bomb tests and reactor operations to determine what additional measures are required to protect existing and future generations from these invisible dangers."

Correction

Through inadvertence the breaking strength of the spar-type H-frame transmission structure described on pages 48 and 49 of Electrical World of August 13 was incorrectly stated. The structure pictured on page 48 failed at 16,000 pounds, not at 1,600 pounds as stated.

SAME voltage rating

. . . ANY strength

When substation design calls for buses to withstand high fault currents, there's often considerable economy in use of insulators of high cantilever strengths. Availability of such insulators affords freedom in structure design, and reduces total number of insulators and points-of-support required.

In the illustration above, the insulators shown are, in order, a Lapp Standard Station Post, a Lapp High Strength Station Post, a Lapp Extra High-Strength Station Post, and a "special" Lapp Station Post of still higher strength. It's "special" only because it doesn't happen to be in the most recent catalog, and because it doesn't fit any previously-established formal strength standards. A customer needed 10,000 lb. cantilever strength in a 23-Kv switch and bus insulator. He got it—in a hurry. If you need an insulator of such characteristics, specify it as Lapp No. 41398. If you need switch-and-bus supports in any other strength rating, we can probably make them, too. The merit of the Lapp Station Post design is reflected in the ease of its stress analysis. The simplicity of the post structure, the uniform reliability of Lapp porcelain, and the certainty of externally-attached caps—instead of pins or inserts —all are such that it is routinely possible to design an insulator into an unexplored strength field, without risk of unknown variables.

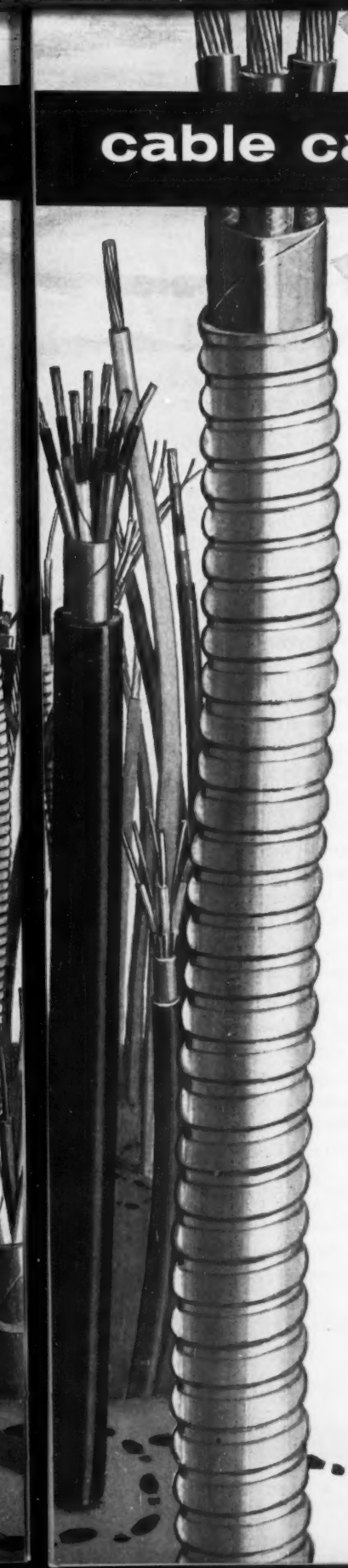
At any voltage rating, in any strength class, Lapp Station Posts give you an *extra* margin of operating security, low upkeep, long life.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

Why selecting the right

cable can be a big problem



You have a plant to wire. You know all the wiring requirements that have to be met. You have catalogs showing an endless variety of power and control cables to choose from. Sure you can pick a *good* one. But how do you unerringly select the *best* for your job? Mostly, it's experience that turns up the *best* from a selection of *good* possibilities. Your own experience is important, of course. And . . . in making the best selection, it's important to remember . . .

How General Electric Can Help You

General Electric has helped many engineers in leading electric utilities and industrial plants solve their wire and cable problems. This experience is at your disposal.

What's more General Electric wire and cable engineers have solved innumerable problems of the same kind which have developed in General Electric's own facilities. And, of course, General Electric knows the requirements of the connected equipment—transformers, load centers, motors, controls, etc. That's experience, too.

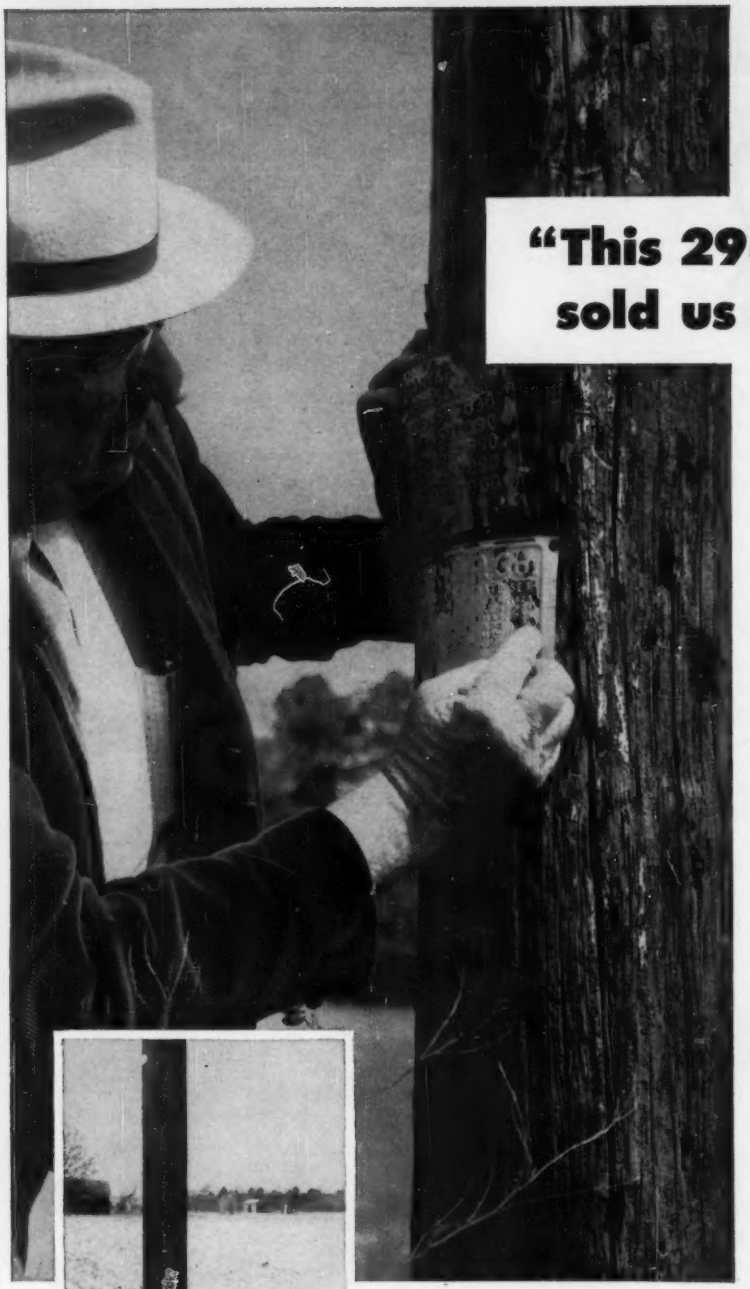
And, since the G-E line of cables covers almost every possible type and construction, these engineers can pick the one cable that will do a given job most efficiently, most economically.

Next time you have a wire and cable problem, why not call on General Electric engineers to help you? Their experience and the tested quality of G-E cables can become an important factor in the efficient operation of your plant.

Write for free information on the specific wire and cable problems that interest you. Address Section W179-827. Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC



"This 29-year-old pole sold us on creosote!"

says District Manager of Georgia Power Company

Power and light consumption in the State of Georgia is growing by leaps and bounds. From 1935 to 1955, it jumped from 11,833,000,000 kilowatt hours to 126,313,000,000 kilowatt hours.

Naturally, poles are playing an important part in this growth. In the Jonesboro District, for example, poles are being added at the approximate rate of 500 per year. And they are all pressure-creosoted. 29-year-old poles like the one shown here have sold the Georgia Power Company on creosote as a preservative. In the words of J. A. Garner, District Manager, "We just don't think about using anything but pressure-creosoted poles anymore."

This is just one example of how power companies are benefiting from the long service life of pressure-creosoted poles and crossarms. For more data on pressure-treatment and USS Creosote—the quality preservative — write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.; or call the nearest United States Steel Chemical Sales Office.

J. A. Garner, District Manager of the Georgia Power Company, examines a 29-year-old pressure-creosoted pole. His comment: "Looks like it will last indefinitely." Inset shows new line installed near Jonesboro, Georgia in 1955. All 500 poles in this line are pressure-creosoted.

USS CREOSOTE

SALES OFFICES IN PITTSBURGH, NEW YORK, CHICAGO, CLEVELAND, SALT LAKE CITY AND FAIRFIELD, ALA.

USS

UNITED STATES STEEL

Favors and Rate Undercuts

For months a Danville, Va., committee has wrestled with the problem of whether its municipally owned, tax-exempt power plant has the moral right to radiate its power lines 20 miles or so in surrounding areas, undercutting bids of privately owned power corporations. The city council finally decided it did and voted to continue the policy.

Meanwhile Danville's Chamber of Commerce publicly had asked Appalachian Electric Power Co to "use its influence in locating new industries in this town" (pop. 35,066). AEP requested Danville to define its future sphere of influence after learning that the city had underbid it in offering power to a building material concern 15 miles away—a contract which will add $5,000 a year to the municipal's income.

Shaft Being Fixed on Spot

Despite adjustments on the lower guide bearing, the shaft of Holyoke Water Power Co's Hadley Falls Station unit became eccentric. The manufacturer said the machine would have to be disassembled and the shaft returned to the factory for repairs. But this meant the unit would be out of service for months.

One of Holyoke WP's employees, Fred Rutka, pondered the problem and eventually got the idea for a cutting tool which could be made to fit around and revolve around the shaft so that the shaft could be turned down while in place. The tool was made at a nearby shop and was tried out. It has been doing such a good job that New England Power Co has sent four men to study it.

For Better or Worse?

Argentina's new regime has set up a special commission to study the country's public service concessions, including American & Foreign Power Corp's ANSEC group, as well as CADE and CIADE, both owned by groups of foreign investors. Under Peron's regime, 60% of A&FP's holdings were expropriated, intervened, or taken over. Far from reversing the Peron stand, many elements in the new government favor further expropriations to make Argentine public utilities entirely state-owned.

In Case of Emergency . . .

TVA's Wilson Hydro Plant is 30 years old now, and engineers feared the generators might "run away" if something went wrong with the governor fluid system which controls eight units. Tests indicated that safety would depend upon how quickly the wicket gates could be closed without aid of governor. In the past it has taken an hour under favorable conditions to shut down a unit with head gates.

So a new compressed-air scheme was developed which required two valves, simple piping, and little expense, reports Teamwork, a TVA-Tennessee Valley Trades & Labor Council publication. Tests showed an operator could shut down a unit from a full-gate opening of 85% to zero position in 22 seconds. It is felt this system will reduce risk greatly in case of an emergency.

Marines Invade Politely

A Marine reserve group which "captured" communications and utilities in the Des Moines, Iowa, area recently during Operation Alert 1956 listed Iowa Power & Light Co's Des Moines Power Station No. 2 among its spoils.

A task force of three men drove up in a car and parked at a bridge below the plant. They walked back to the guard house, approaching from three directions, and said to the guard:

"This plant is seized. Can we use your phone?"

Tough Course Laid Out

Public Service Electric & Gas Co has created a program of advanced study for its engineers on power systems engineering. Patterned after a General Electric Co course, it will help PS engineers become proficient in the application of modern analytical methods and equipment. Course is designed to (1) Instruct engineers with 3 to 10 years' experience with the company in systems engineering, (2) Provide a medium for idea exchanges among company engineers, and (3) Produce a nucleus of personnel that can act in a consultant capacity.

Classroom instruction consists of 30 weekly day-long sessions in five fundamental power systems subjects. They are: Power system analysis, protective relaying, surge phenomena, power system engineering problems, and advanced circuit analysis and operational methods. Participants must display an "intense interest in power systems engineering," have a knowledge of elementary differential equations and steady state circuit theory, and be prepared to handle 15 to 20 hours of homework a week.

Rebuffed Again . . .

Oregon Attorney General Robert Y. Thornton has received his second rebuff as the state's Supreme Court refused to pass his petition which would have foiled construction of Portland General Electric Co's Pelton dam project on the Deschutes River. Earlier, the U. S. Supreme Court had upheld the contested FPC license.

MONDAY found fly ash conferees inspecting Duquesne Light's fly ash and slag road. Its' ability to stand up to punishing traffic and weather has prompted Pennsylvania to use fly ash for road base choking. Conferees also in-

spected a 180-ft demonstration road of various fly ash containing surfaces and bases. Installed to demonstrate the worth of fly ash, it's sections are laid crosswise so each of 400 ten-ton daily coal deliveries pass every section

Fly Ash Demand May Top Supply

What is hoped will be the start of a concentrated effort by utilities to market fly ash was launched in a three day conference sponsored by Electrical World and held at Pittsburgh, July 30-Aug. 1. More than 150 representatives of major utilities, government agencies, research organizations, railroads, equipment manufacturers, and fly ash users attended.

The second day's meeting stressed the potential for fly ash in highway and other heavy construction.

Getting sales started and making a success of selling fly ash were emphasized. Research and developments in processing fly ash into lightweight aggregate and cement were the subject of a manufacturers forum.

Inspection trips included Duquesne Light Co's fly ash test roads, and Koppers Co, Inc, Agglomoration Laboratory's demonstration of sintering fly ash into light weight aggregate.

The third days' inspection also included a visit to the Rochez Brothers, Inc, cement block plant where flyash is used in each of the 20,000 blocks produced daily.

An important development of this meeting was the announcement by Allis-Chalmers Manufacturing Co that it had developed a process in which fly ash would be used in the manufacture of portland cement. Wisconsin Electric Power Co also announced that it plans to supply about 50,000 tons of fly ash a year to the first unit of the Marquette Cement Co's new Milwaukee plant. Here are the high highlights of the meeting.

9:30—The Market for Fly Ash, Demand Could Exceed Supply

H. H. RUSSELL, Project Engineer, Bituminous Coal Research, Inc.

In order to sell the 8¼ million tons of fly ash produced annually, we must consider only large scale possibilities. Highways offer the largest single potential. There are at present fly ash roads in Nebraska, Alabama, Kansas, Illinois, Wisconsin, Minnesota, and New Jersey. Pennsylvania has one scheduled, and there is preliminary interest in several other states.

The six mile concrete road in Alabama is a Federal Aid Highway. In this case it made possible savings of 15¢ per sq yd.

About 17.4 million tons could be used annually in roads built in the major fly ash producing areas. That's about three times the total amount produced in these states.

Mass concrete projects provide good opportunity for fly ash use, and this practice is becoming widespread. Some of the latest of these are the Mackinac Bridge across the Straits of Mackinac (30,100 tons), the Mobile Bay Bridge in Alabama (854 tons), Liberty Dam in Baltimore (8,300 tons), and Hoover Dam in Ohio (8,200 tons).

A good lightweight aggregate can be made from fly ash. Two billion buildings blocks are produced annually. Each block could contain one pound of dry fly ash—a market for one million tons. When fly ash aggregate is used, the market potential goes up 20 times.

A second market for aggregate is in ready mixed concrete. A conservative figure of one ton per sq yd means a market of 58 million tons.

Fly ash is now a recognized and accepted building material in many parts of the country. Its use can give added quality and save very significant amounts of money. Probably the most important development has been the adoption of two specifications by the ASTM. The ASTM also accepts fly ash as a pozzolan. These specifications are very important when fly ash is suggested to any concrete user or supplier. Seven other specifications have been adopted in various parts of the country. The existence of these various specifications have established fly ash as an acceptable building material.

TUESDAY'S meeting stressed the potential market, getting sales started, and developments in processing fly ash. It was at this session that Wisconsin Electric Power disclosed it would supply 50,000 tons a year for cement manufacture

WEDNESDAY conferees inspected experimental sintering equipment at Koppers Co Agglomeration Laboratory. Here air is passed through loose bed of pellatized ash—burning combustables. This hardens pellets into aggregate

10:15—Fly Ash in Heavy Construction

WALTER H. PRICE, Chief, Division of Engineering Laboratories, Bureau of Reclamation

Fly ash was first used by the Bureau in 1942 in a repair job at Hoover Dam. Since then, it has been under constant investigation. In 1948 it was decided to use fly as a replacement of up to 32.4% of the portland cement in the construction of Hungry Horse Dam. Since then, the Bureau has issued a total of nine specifications which have permitted the use of a natural pozzolan or fly ash in concrete.

	Cost per ton at railhead		Tons used
	Fly ash	Portland cement	Fly ash
Hungry Horse	$18.00*	$24.64	125,781
Canyon Ferry	12.88	22.20	16,175
Palisades	11.90	21.30	9,000**

* Contractor's bid price. Cost fly ash fob Chicago, $1.00 with freight to Coram, Mont., $10.60.
** Estimated—still under construction.

Apart from economic considerations, pozzolans (including fly ash) are used in large concrete dam construction because:

1. They combine with lime liberated during the hydration of the portland cement to produce a more stable product which is not so easily leached from the concrete and is more resistant to chemical attack by mineral-free waters.

2. They contribute to the ultimate strength of the concrete. At later ages concretes containing fly ash develop higher strength.

3. Pozzolans produce lower heat of hydration than an equal amount of portland cement. Excessive temperature rise in mass concrete may result in cracking. It is important that temperature be controlled for this and other reasons.

4. They make the concrete more impermeable. Concretes containing 25 to 30% fly ash by weight of the cement have permeability rates of negligible magnitude.

5. They reduce disruptive expansion caused by the reaction between certain aggregates and alkalis in cement.

6. They usualy add to the workability of the concrete. Fly ash, in particular, because of the spherical shape of its particles, contributes greatly to workability.

7. Fly ash reduces drying shrinkage. It is unique among pozzolans in that it usually reduces the amount of water required to produce a workable concrete. The more water the more shrinkage.

Carbon is objectionable because at best it does not contribute to the pozzolanic activity of the fly ash and acts as a diluent. Carbon can also be objectionable because it sometimes has a marked effect on the air content of concrete where an air-entraining agent is used.

There is still much to learn about the effect of fineness, carbon content, SO_3 content, and other constituents of fly ash so that realistic specification limits can be set to include all fly ashes that are satisfactory from a concrete making standpoint.

10:45—Where Do Utilities Now Stand on Selling Fly Ash

J. B. HOMSHER, Manager, Personnel and Purchasing, Gilbert Associates, Inc

A recent survey revealed 36 utilities produced 5 million tons of fly ash during 1955. Nineteen of the 36 sold 367,000 tons, or 7½%. Sales in bulk ranged from $1 to $2 per ton; in bags from $4 to $7 per ton.

In considering the sale of fly ash, the following must be recognized:

1. Number of uses and volume of market is greater for suitable dry dust than for light weight aggregate.

2. The price of suitable dry dust is greater than that of fly ash suitable only for sintering.

3. The difference in price of the two grades of fly ash can justify designing into plants the ability to produce suitable dry dust for concrete use without interfering with capability, operation, or economy of the plant.

Gilbert Associates is presently designing, for installation in Japan, a system of variable efficiency mechanical collectors followed by electrical precipitator with separate dust conveying systems to a coarse and fine dust silo. The fine dust will be sold for concrete use and the coarse dust for fill and in the future for aggregate production.

Continued on next page

11:15—Getting Fly Ash Sales Started

R. C. WENZ, General Purchasing Agent, Duquesne Light Co.

On the top of the list of things to be done is to explain all phases of your sales plan to all levels of the operating department. Shipping schedules must be carefully set up so that the operating men can balance disposal and shipping schedules. Next in importance is maintaining a uniform carbon content against a specification.

Economies of income instead of disposal cost make it possible to justify an improvement in engineering as it applies to fan capacity and dust collecting equipment. If these economies are considered during design, burning and collecting efficiency can be improved; and uniformity will be more consistent at desirable levels.

11:45—A Decade of Experience in Cooperative Research and Development of Fly Ash Markets

P. H. CHASE, Assistant to the Vice President in Charge of Engineering, Philadelphia Electric Co.

Fly ash is a product that is difficult to sell, and highly trained technical people are needed in the promotional stage. Furthermore, the material itself is difficult to handle and is sufficiently variable in its characteristics as to give rise to many problems from the consumer's standpoint which must be carefully considered.

STANLEY MOYER, Assistant Mechanical Engineer, Philadelphia Electric Co.

Many structures, some of them in the multi-million dollar class, have been erected using the experience of a research group working on the use of fly ash in concrete. More recently there has been considerable interest in highway concrete.

The use of fly ash as a filler in bituminous compositions, particularly pavement, has been established as a good outlet. Considerable work has been done in developing the use of fly ash in asphalt roofing. Roofing shingles containing fly ash have been on the market for a number of years.

A program in which we have cooperated has progressed to a point where aggregate is being produced in relatively simple equipment. A pilot plant has been operating for six months, and a production plant is being designed.

Some years ago two Philadelphia Electric engineers discovered that certain percentages of lime, fly ash, and aggregate form compositions which developed high compressive strength when subjected to curing under natural weathering. This material is being commercially used in the construction of airfields, highways, secondary roads, parking lots, and drive-in theaters.

2:00—Making a Success of Selling Fly Ash

FLOYD S. NIXON, Development Engineer, Salvage Sales Section, Detroit Edison Co.

Detroit Edison Co is firmly convinced that fly ash is a useful engineering material and will prove increasingly valuable. First step in a successful marketing program is determining the properties of the ash being produced and the extent to which it is likely to vary.

As our markets are for dry fly ash, large storage facilities are essential. Storage and other facilities, and the number and type of customers are two factors which are directly related to the size and number of jobs you can expect to handle efficiently and dependably. Neglecting our regular customers to supply a large job would increase sales for two or three years but does not seem the best long term approach. In addition to the revenue from the sale of fly ash we have been able to use it profitably, having saved $70,000 using fly ash concrete in the construction of our River Rouge Plant.

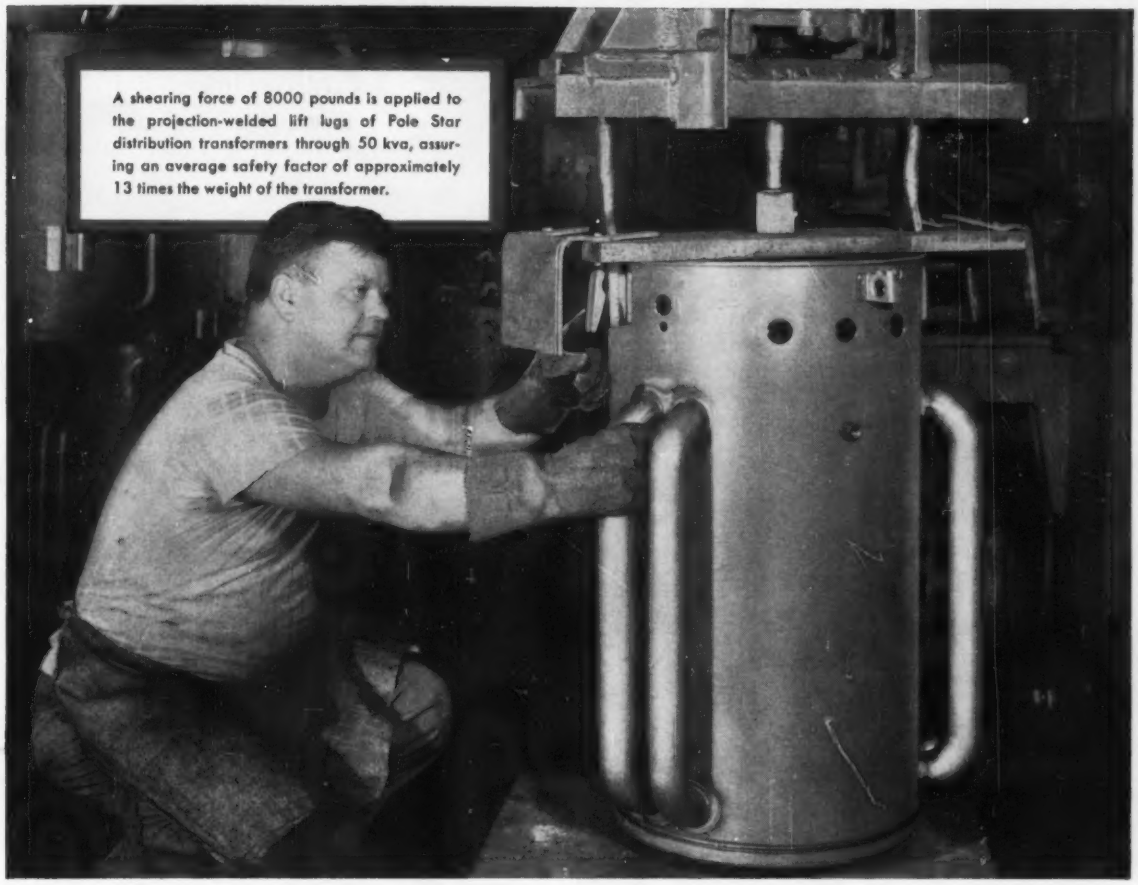
C. M. WEINHEIMER, Mechanical Division Supervisor, Engineering Laboratory and Research Dept., Detroit Edison Co.

The 100,000 ton market we now enjoy was developed through extensive missionary work and a continuing research program. At present Detroit Edison has under investigation an experimental concrete roadway and a number of other research projects. Lime fly ash soil stabilization is being tried. Experiments with soil ranging from sand to clay are being conducted to determine the sensitivity of the stabilizing agent to varying soil conditions and the effectiveness of various types of equipment used in this type of operation.

Initial runs of fly ash sintering have been made on manufacturers pilot plants. Our work on beneficiation is being done mostly by manufacturers of magnetic separating equipment. Also, studies have been started to find lower cost fly ash storage facilities.

A research program to investigate the fundamental properties of fly ash (not being examined by anyone) is needed.

Continued on page 20


A shearing force of 8000 pounds is applied to the projection-welded lift lugs of Pole Star distribution transformers through 50 kva, assuring an average safety factor of approximately 13 times the weight of the transformer.

He's got a lot of *P-U-L-L*...4 tons for every POLE STAR® transformer

Lift lugs of Pole Star distribution transformers through 50 kva* are subjected to a shearing test that simulates a 4000-lb. "lift" for each lug. Depending on the weight of the particular transformer, this Pole Star production control assures an average safety factor of approximately 13.

The shearing force is produced by a hydraulically powered lift that pulls upward on the lugs (total pressure is 8000 lbs.) while the transformer tank is held firmly in place by means of the center rod and transverse bar visible in the above photo.

**Different manufacturing and testing procedures are used for the lift lugs of larger transformers.*

This force is great enough to shear off any lugs that are not perfectly welded, so that no "borderline" cases can survive the test.

Even years after a transformer is installed, the reliability of lift lugs can be of extreme importance. (For example, the unit might be removed for replacement by a larger transformer, or for repainting.) To make certain that Pole Star quality will be maintained during the years ahead, every lift lug is coated with a long-lasting sealing compound before being projection welded. This compound prevents rust-weakening of the lift lugs by effectively blocking out moisture from the welded area.

167 Production Controls make Pole Star Best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.

2:45—Manufacturers Forum on Processing Fly Ash

W. F. STOWASSER, Engineer, Processing Machinery Dept., Allis-Chalmers Manufacturing Co.

Magnetic separation of fly ash into blast furnace feed and a nonmagnetic material for agglomeration into a lightweight aggregate has been investigated in the laboratory.

Substitution of fly ash for the argillaceous component in cement manufacture has produced a good grade of cement clinker in a pilot plant. A commercial plant is under construction. A cement plant producing 1,250,000 bbl of cement per year will require 56,200 tons of fly ash.

H. D. VANDERLIP, Engineer, Processing Machinery Dept., Allis-Chalmers Manufacturing Co.

Mechanical screening removes approximately one-half of the initial carbon content of fly ash making the remainder a much more suitable product for marketing. Local markets for ash will determine consideration to be given screening.

To date, two commercial fly ash screening installations have been made. Screening of fly ash, where possible, will improve quality control, recover valuable BTU's, and improve marketnig possibilities.

EDWIN H. HOWER, Manager, Industrial Dept., Dravo Corp.

We estimate (on the basis of experience with other materials) investment in sintering equipment will run between $300,000 and $500,000 for a plant producing 100 tons per eight-hour turn. The variation will depend on size and type of building required for raw material and product, extent of office and locker rooms, and other similar items subject to individual plant preference.

Operating costs will include three to four men per shift; 300 to 500 hp of connected motor loads; about 20 million Btu per hour of gas, oil, or pulverized coal for ignition of the charge; and an indeterminated amount of solid fuel for mixing in the charge, should the carbon content of the fly ash require it.

H. B. GORMAN, Sintering Engineer, Heyl & Patterson, Inc.

Successful development of an acceptable fly ash sinter depends on cooperation among utility companies, equipment manufacturers, and ultimate consumers. Only the producer and consumer can decide shape, size, weight, color, and chemical limitations. Physical characteristics (friability, water absorption, crushing load) and building code requirements also must be decided.

A product acceptable to one firm for masonry units may not be acceptable to some other firm or for some other use.

ANDREW J. KANTOR, Sales Engineers, Koppers Co., Inc.

Chemical and physical characteristics of fly ash affect its sintering and pelletizing characteristic. Size of a sintering machine to produce a given amount of aggregate depends on the sintering rate of the fly ash used.

If it has insufficient carbon or if a fused sinter cake or a blend with bottom ash is desirable, extra bins will be needed. A fused sinter cake would probably necessitate installation of a breaker. A test of sintering characteristics must be made before equipment requirements can be compiled.

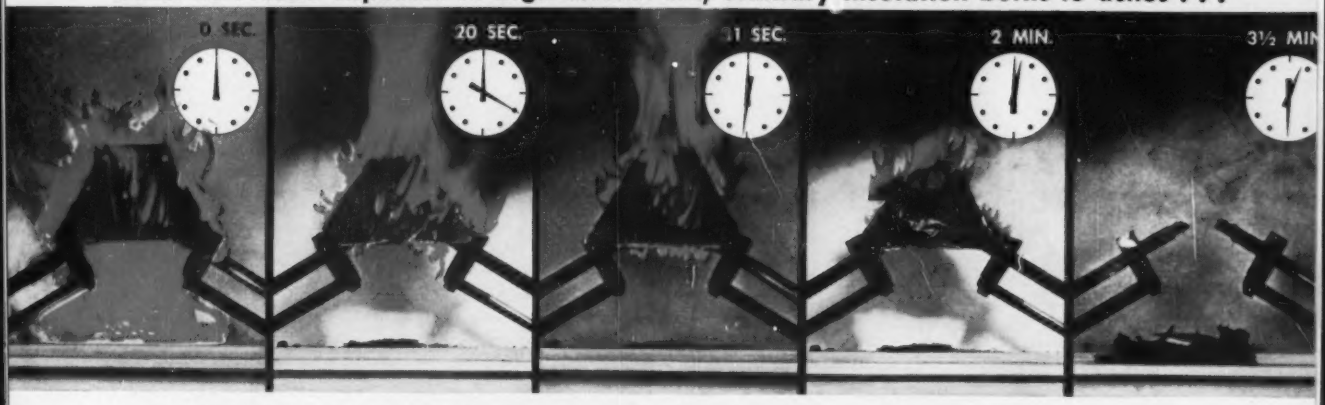
Estimated cost of producing fly ash aggregate, based on a 1,000-yard-per-day plant, is $1.23 a cu yard excluding administrative and other costs. Lightweight aggregate in New York City sells from $3.75 to $5.15 per cu yd.

ALLEN R. ROWEN, Project Engineer, Dwight-Lloyd Division, McDowell Co., Inc.

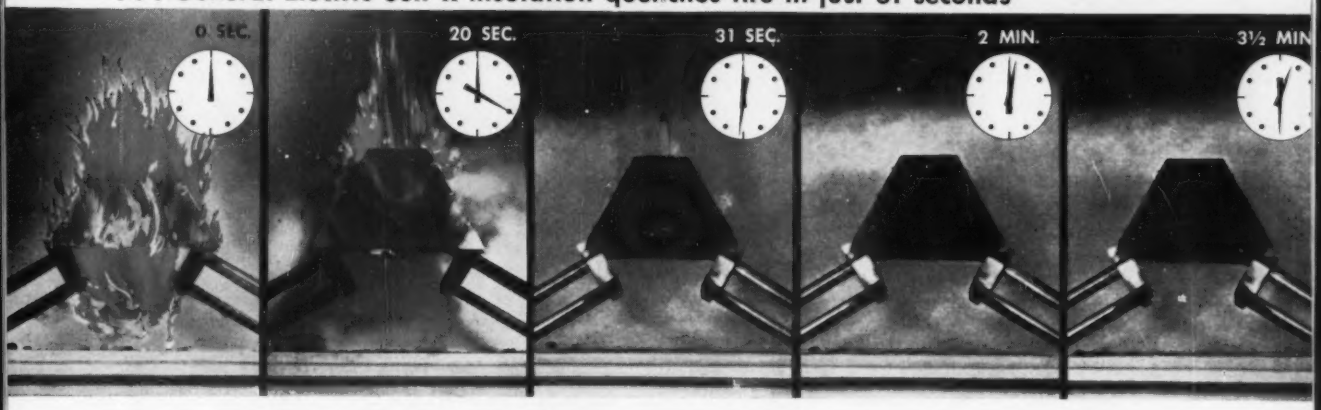
The demand for a lightweight product has been strongly increasing. To satisfy this demand, several plants have been built to manufacture it by burning clay and shale. If fly ash aggregate were available at the right price, there is virtually no area in the country that could not absorb every pound that could be produced.

Favoring fly ash is the fact that most power plants are located where the demand for lightweight aggregate is heaviest. And fly ash plants, per unit output, will be less expensive to build and operate than clayshale plants.

After 10 second exposure to high current arc, ordinary insulation burns to ashes . . .



. . . General Electric Self-x insulation quenches fire in just 31 seconds



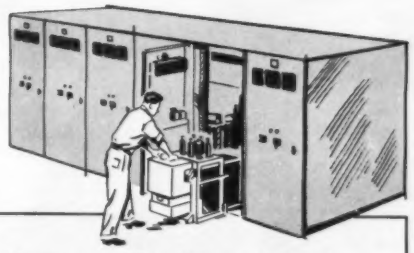
Here's Why General Electric Metal-clad Switchgear Provides Maximum Fire Protection

Just 31 seconds—that's how long it took General Electric's new Self-x insulation to quench the flame after direct exposure to a high current arc for 10 seconds. Ordinary insulation, subjected to the same test, burned until nothing was left but a pile of smoldering ashes. This "baptism by fire" furnishes conclusive proof that recently improved Self-x insulation provides users of G-E Metal-clad Switchgear with unsurpassed fire protection.

Built for rugged duty in service where reliability and continuity count, failures are extremely rare. To protect against this remote case, Self-x flame retardant insulation helps protect vital points. Should fire ever occur, compartments would be accessible within seconds after the source was removed. "New Self-X Polyester Glass Insulation" will give you the full story. For your copy of this new publication, see your G-E Apparatus Sales Representative, or write for Bulletin GER-1193, Section 511-16, General Electric Company, Schenectady 5, New York.

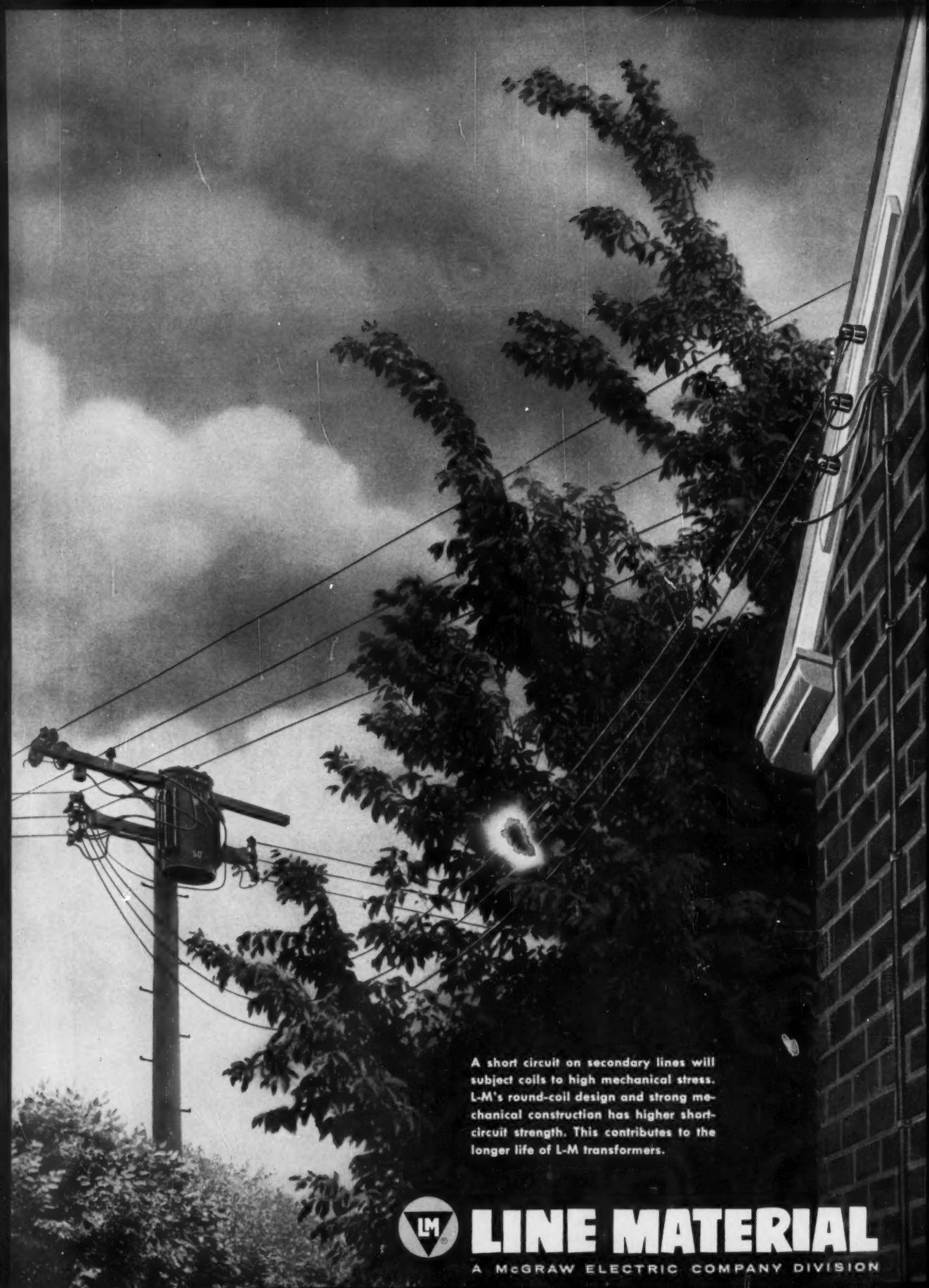
Progress Is Our Most Important Product

GENERAL ELECTRIC



G-E . . . The Most Modern Metal-Clad Switchgear You Can Buy

- NEW SELF-X INSULATION
- BETTER MOTOR PROTECTION
- EASIER, SAFER HANDLING
- HIGHER RATINGS
- 5-CYCLE CLEARING TIME
- EASIER MAINTENANCE
- EXTRA STRONG FRAME



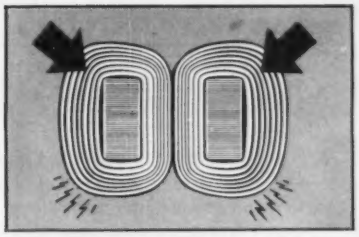
A short circuit on secondary lines will subject coils to high mechanical stress. L-M's round-coil design and strong mechanical construction has higher short-circuit strength. This contributes to the longer life of L-M transformers.

LM

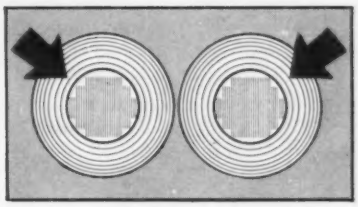
LINE MATERIAL

A McGRAW ELECTRIC COMPANY DIVISION

Small core-coil assemblies are removed from varnish dip, ready for curing ovens. Varnish is limited to a few outer layers of the coil and a short distance in from the coil ends. This adds mechanical strength, which is achieved while still permitting complete oil impregnation throughout the coil. In large transformers, where forces are greater, core-coil assemblies are completely vacuum-impregnated with varnish.



Rectangular Coils: Under short circuits, rectangular coils tend to distort to a round shape; are subjected to insulation damage or even complete failure of the coil.



Round Coils: Since the coils on Round-Wound transformers are already round, short-circuit currents produce little or no radial distortion in the coils.

Here's Why L-M's Round-Coil Design Insures Higher Short-Circuit Strength

Another big reason why more customers are specifying L-M Round-Wound® Transformers

By **ALBERT C. WURDACK**
Chief Engineer
Large Distribution Transformers
Line Material Company

An important feature of a transformer is its ability to withstand the mechanical forces created by heavy short-circuit currents. The round coils of L-M's Round-Wound transformer and its mechanical construction have an important effect on minimizing these internal stresses.

Round Coil Design

When rectangular coils are short-circuited, the heavy currents tend to force the windings into circular shape. The coils are therefore subject to physical distortion, which may result in damage to the insulation or even complete failure of the coil.

But round coils, already circular, are not stressed out of shape. The radial forces are distributed evenly with little or no effect on the coil.

Strong Mechanical Construction

L-M's core clamping structure utilizes rugged formed steel channel and clamping bolts. Sturdy, oil-impregnated maple blocks at top and bottom are tightened and clamped against the coil ends to prevent axial movement.

In addition to strong blocking and clamping, L-M has developed an excellent varnish application. The varnish has high bonding strength to resist short-circuit mechanical shock. It has high resistance to oil, will not dissolve in or contaminate the oil in long-term service. The varnish can be cured at low temperature, avoiding insulation damage.

Thus round coils, plus rugged mechanical construction, give Round-Wound transformers higher short-circuit strength and longer life.

For More Information

Ask the L-M Field Engineer for more complete information and bulletins on L-M's Round-Wound transformers. Or write Line Material Company, Transformer Division, Zanesville, Ohio.

Five Reasons Why More Customers Are Selecting L-M Round-Wound Transformers

1. Higher Uniform Impulse Level: Round coils are *wound* into shape. Therefore insulation is not damaged by malleting into rectangular shape. Coils have longer creepage distance between windings and between leads.

2. Higher Short-Circuit Strength: Round coils are not stressed out of shape under high radial short-circuit forces. Strong steel frame, heavy clamping bolts, sturdy maple blocks and varnished coils prevent axial movement.

3. Higher Short-Time Overload Capacity: Round coils and the cruciform cross-section core expose large surfaces to cooling oil. The result is relatively low hot-spot temperatures, which add considerably to high short-time overload capacity.

4. Balanced Performance: The core is a continuous wound strip of oriented steel. Coils are wound directly onto this core. Since the core is not cut, unwound, or disturbed in any way after annealing, there are no air gaps to break up the flux path. This results in low exciting current and core loss.

The wound-core, round-coil design permits fewer winding turns and smaller turn diameter. This results in low impedance, and provides better regulation at all power factors.

5. Additional Capacity on Pole: L-M's new obround tank design makes the unit smaller and lighter, with shorter moment arm from the pole. This combination reduces the bending moment on the pole and crossarms, and thus greatly increases the potential capacity of existing transformer structures.

Transformers

NEWS ABOUT PEOPLE

New Jersey Utilities Elect 4 Vice Presidents

Jersey Central Power & Light Co and New Jersey Power & Light Co have announced the election of four vice presidents—William H. McElwain, Howard B. Allen, Edward J. Ingram, and Robert R. Parker.

Their election is part of the integration of the operations of the two New Jersey utilities, both of which are subsidiaries of General Public Utilities Corp.

McElwain, formerly vice president in charge of operations for Metropolitan Edison Co, another GPUC subsidiary, was elected vice president in charge of engineering and operations of JCP&L and NJP&L. He began his public utility career with New York State Electric & Gas Corp shortly after graduation as a mechanical engineer from Rensselaer Polytechnic Institute in 1926. He served that company in various capacities until 1949, when he resigned to accept the position of superintendent of operations with Metropolitan Edison. The following year he was elected vice president in charge of operations of MECO's Western Division with headquarters at York, Pa. In 1951 he joined the company's executive staff as vice president in charge of operations for the entire company, the position he is now resigning to join JCP&L and NJP&L.

WILLIAM H. McELWAIN

HOWARD B. ALLEN

Allen, who now becomes vice president in charge of employee and public relations for both companies, previously served as vice president and director of NJP&L. After five years association with Westinghouse Electric Corp as sales engineer in Mexico and Cuba, Allen joined Metropolitan Edison Co in 1925, where he served in Lebanon, York, and Reading, and subsequently was named division manager. In 1934 he was appointed general manager of NJP&L, and was elected to his present position in 1935.

EDWARD J. INGRAM

Ingram, elected vice president in charge of sales for NJP&L and JCP&L, has been active in the electric utility business for 33 years. A graduate of Massachusetts Institute of Technology in electrical engineering, he started his utility career in 1923 with Brooklyn Edison Co. He joined MECO in 1934 as lighting director and subsequently was placed in charge of all sales and related activities. In 1949 he was elected vice president in charge of sales, rates, and commercial activities for JCP&L, where he is also a director.

ROBERT R. PARKER

New vice president in charge of accounts and finance, Parker has served as vice president, treasurer, and a director of New Jersey Power & Light since 1944. He was employed by Utility Management Corp, (GPU System) in 1930 as bookkeeper, and later held positions progressively up to secretary and treasurer of the corporation. In 1941 he was appointed assistant treasurer of Associated Gas & Electric Co and Associated Gas & Electric Corp. During the period 1941 through 1944 he held various other corporate positions, including vice president of New York State Electric & Gas Corp.

In addition to the vice presidential appointments, JCP&L and NJP&L have named two other officers whose duties will extend over both companies. They are Jackson T. Murphy, who becomes treasurer and assistant secretary, and Alfred Healey, secretary. Murphy is former JCP&L treasurer and assistant secretary, and Healey has been secretary and assistant treasurer of NJP&L.

Clyde A. Mullen continues as vice president of JCP&L until his retirement early next year.

NEW
TAPIT with
STRIPSEAL
PROCESS

For the first time a clamp type connector factory-filled with oxide inhibiting compound. Now you can be *sure* your aluminum connections are being properly made. Installation forces the compound around and between aluminum cable strands —breaks the oxide film, affords more even distribution of current throughout the joint. For more information, write Burndy, Norwalk, Connect.

STRIPSEAL — for an oxide seal!

BURNDY

56-11

Norwalk, Connect. • Toronto, Canada • Other Factories: New York, Calif., Toronto • Export: Philips Export Corp.

SIGECO Appoints A. M. Guy Engineer

ARTHUR M. GUY

Southern Indiana Gas & Electric Co has announced the recent appointment of Arthur M. Guy as chief mechanical engineer. His chief responsibilities will include the staffing of the new Aluminum Co of America power plant located nearby which will be operated by SIGECO. In addition he will aid in the training of these employees and will serve as a contact between Alcoa and Southern Indiana G&E in matters pertaining to the new plant.

Guy previously was with the former Commonwealth & Southern Corp's service company. He was also associated with Pennsylvania Power Co, then a subsidiary of that system.

W. H. EVANS

Controls Firm Elects Evans President

Minneapolis-Honeywell Regulator Co, Ltd, has elected W. H. Evans president of the Canadian company. As president he succeeds Harold W. Sweatt, who has been elected board chairman.

The new president has been serving as general manager of the company since 1941 and as vice president and general manager since 1951. Evans, who attended the University of Toronto, has been associated with Honeywell since 1931, when he joined the firm as credit manager. He previously was with Manufacturers Life Assurance Co; Homer L. Gibson Co, Ltd; and Auto Electric Service Co, Ltd.

PERSONAL BRIEFS

George R. Herbert, associated with Stanford Research Institute, Menlo Park, Calif., as executive associate director and manager of business operations, will join American & Foreign Power Co Sept. 1 as staff assistant to **Henry B. Sargent,** president.

South Carolina Electric and Gas Co has promoted **Alex H. Pregnall, Jr,** from design engineer to construction engineer. He will head engineering and construction at McMeekin Station, being built at Saluda Dam.

Current changes at Metropolitan Edison Co made **Frederic Cox** Western Division manager to succeed **G. Raymond Parry,** recently appointed vice president. **Richard E. Dreas** succeeds Cox as Eastern Division manager.

American Institute of Electrical Engineers has honored **Laurence K. Del 'Homme,** superintendent of engineering for Houston Lighting & Power Co, with a fellowship.

Boston Edison Co has named **George A. Orrok** as superintendent of its engineering-construction department.

Joe M. Hinds is new Western Division manager of Mississippi Power & Light Co succeeding **H. M. Jolly,** who will retire this fall. New assistant division manager of MP&L's Central Division is **Joe H. Box,** and new Western Division engineer is **Tom Dallas,** succeeding Box.

The steam turbine department of Allis-Chalmers Manufacturing Co has appointed four men to the post of engineer-in-charge. **Ellis P. Hansen** is engineer-in-charge of mechanical design; **A. Clifford Holmes,** steam design; **John K. Dixon,** development section, and **Francis E. White,** marine and navy turbine sales.

Cole Electric Co has made **H. P. Sparkes** sales manager and **Charles Gerckens** chief engineer . . . Sacramento Valley Electric League has announced its new officers—**Arthur M. Banchero** will serve as president and **James Bauman,** vice president.

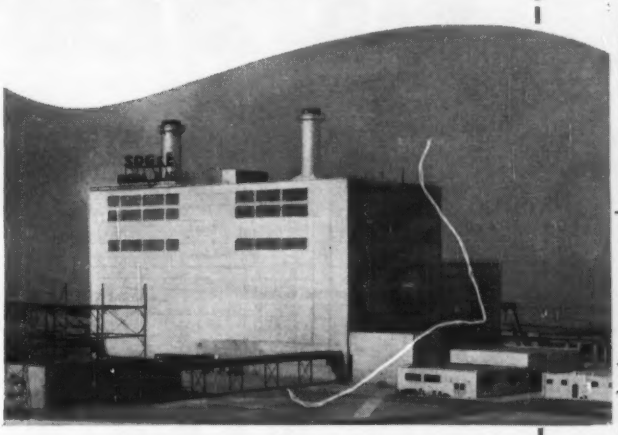
Herbert Hoover, Jr, Under Secretary of State, was presented the Hoover Medal for 1956 for "distinguished public service" by American Society of Civil Engineers; American Institute of Mining, Metallurgical and Petroleum Engineers; American Society of Mechanical Engineers; and American Institute of Electrical Engineers. The medal was named for his father, former President Hoover.

OBITUARY

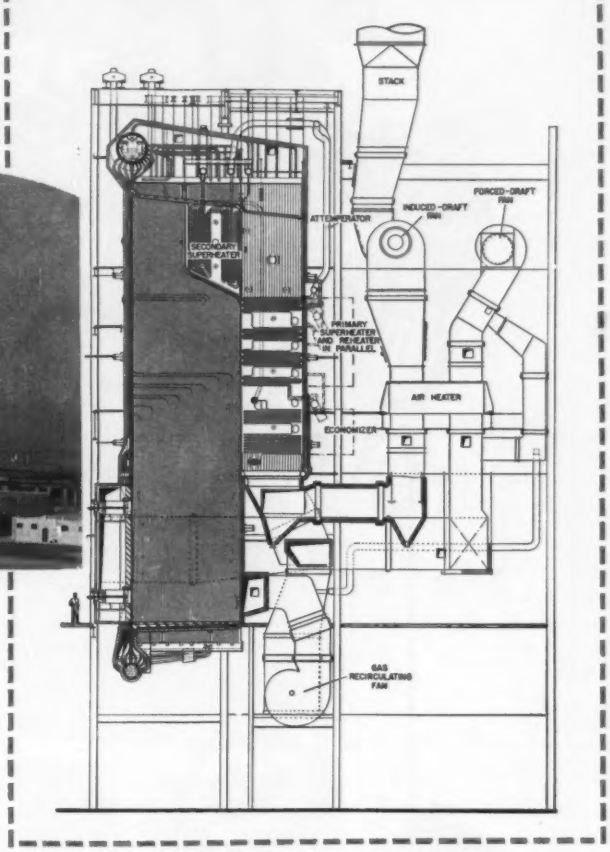
William B. Goudey, 79, a director and retired vice president of New York State Electric & Gas Corp, died recently after a brief illiness.

Ford Kurtz, 71, president of the J. G. White Engineering Corporation, died recently after a short illness.

B&W Radiant Boilers at Encina are fired with oil or natural gas, with provision for future use of coal. Each unit produces 775,000 lb of steam per hr. Pressure is 1550 psi and temp. 1000 F, with reheat to 1000 F. Design features gas recirculation and cyclone steam separators for natural circulation. Boiler design pressure is 1725 psi.



Modern Encina Power Plant is the latest addition to San Diego Gas & Electric Company's expanding facilities. With two units already in operation, excavation is already underway for a third unit which is scheduled to be in operation in 1958. The design engineering firm is Pioneer Service and Engineering Company, Chicago, Illinois.



San Diego Gas and Electric Company's

ENCINA POWER PLANT

installs New B&W Radiant Reheat Boilers to assure low maintenance—efficient steam generation

Since 1941, this progressive utility has increased its generating capacity almost five times. Its capital investment has grown to about 200 million dollars, and still further expansion is scheduled beyond 1958.

Concrete evidence of this foresighted policy is the new Encina Power Plant. Unit No. 1 went on the line in 1954. Unit No. 2 was placed in operation in July of this year.

Steam at Encina is generated by B&W Radiant Reheat Boilers. These boilers with their turbines and generators increase generating capacity by 212,000 kw—three-eighths of the system total. These are the 34th and 35th B&W boilers to be installed by this utility since 1903. Their choice for Encina is a reflection of long service satisfaction.

B&W boilers are products of 90 years of boiler engineering and construction experience, plus advances gained through B&W's continuing, intensive research and development activities. This strong combination has but one purpose—to build better boilers to help raise steam-electric power generation to new levels of efficiency. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

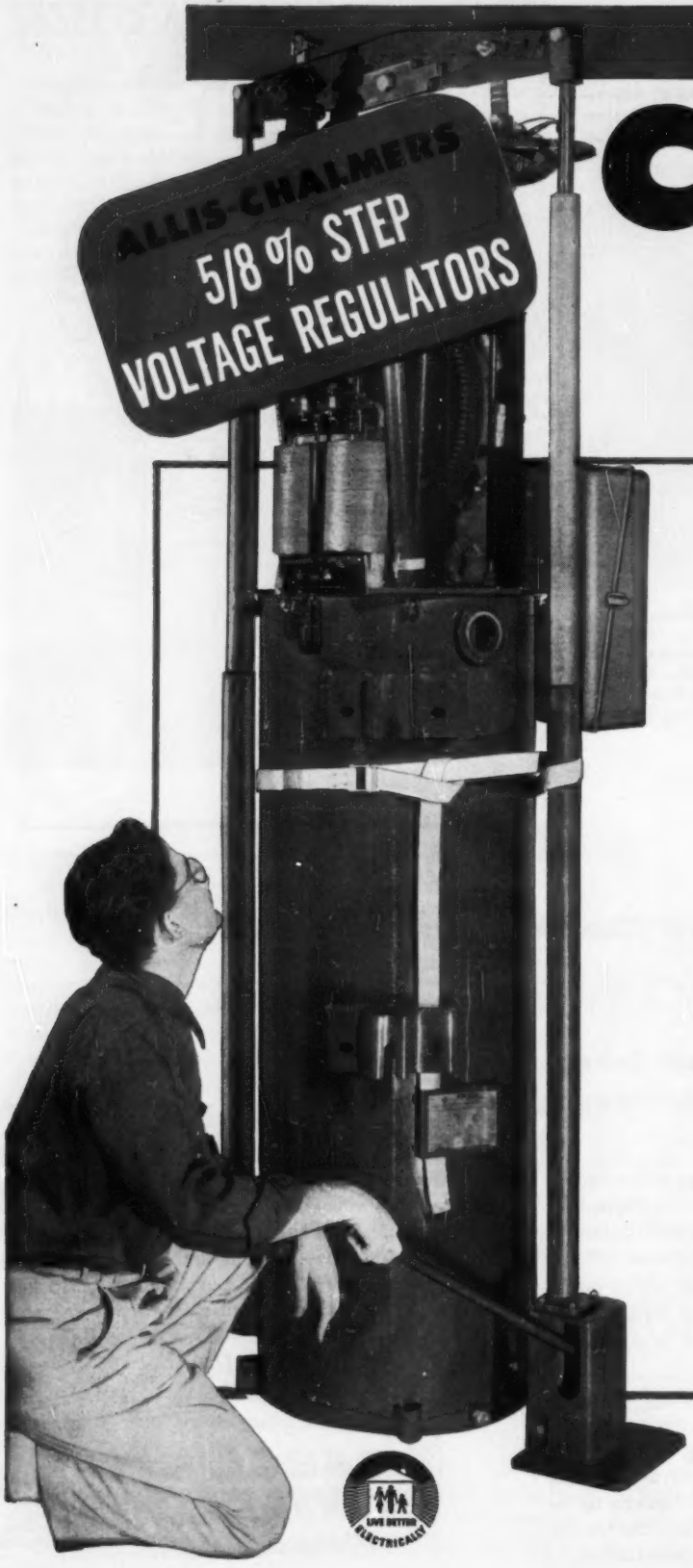
G-816-CS

BABCOCK & WILCOX

BOILER DIVISION

Compare

Cover Cuts



Here's All You Do to Open Allis-Chalmers Distribution Regulator for Inspection

1. Remove handhole cover and (without tools) disengage position indicator.
2. Remove cover bolts and control cabinet mounting bolts.
3. Attach the hydraulic jack to lifting lugs and hoist for inspection.

LIVE BETTER ELECTRICALLY

ALLIS-

Regulators:

Suspension Inspection Cost 75%

No other regulator offers unit untanking in the field or service shop

Check Operation...

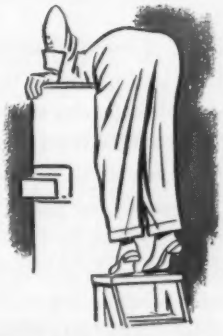
This is the only regulator that can be checked outside the tank without reassembling parts. Simply apply 120 volts to control. Re-tanking, upon completion of inspection, is simple, too.

Compare and save! Ask your A-C office for the story on Allis-Chalmers 5/8% step regulators, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Eliminate These Time-Consuming Steps

1 Eliminate oil draining and handling.

2 Eliminate disconnecting and removal of bushings and cover.



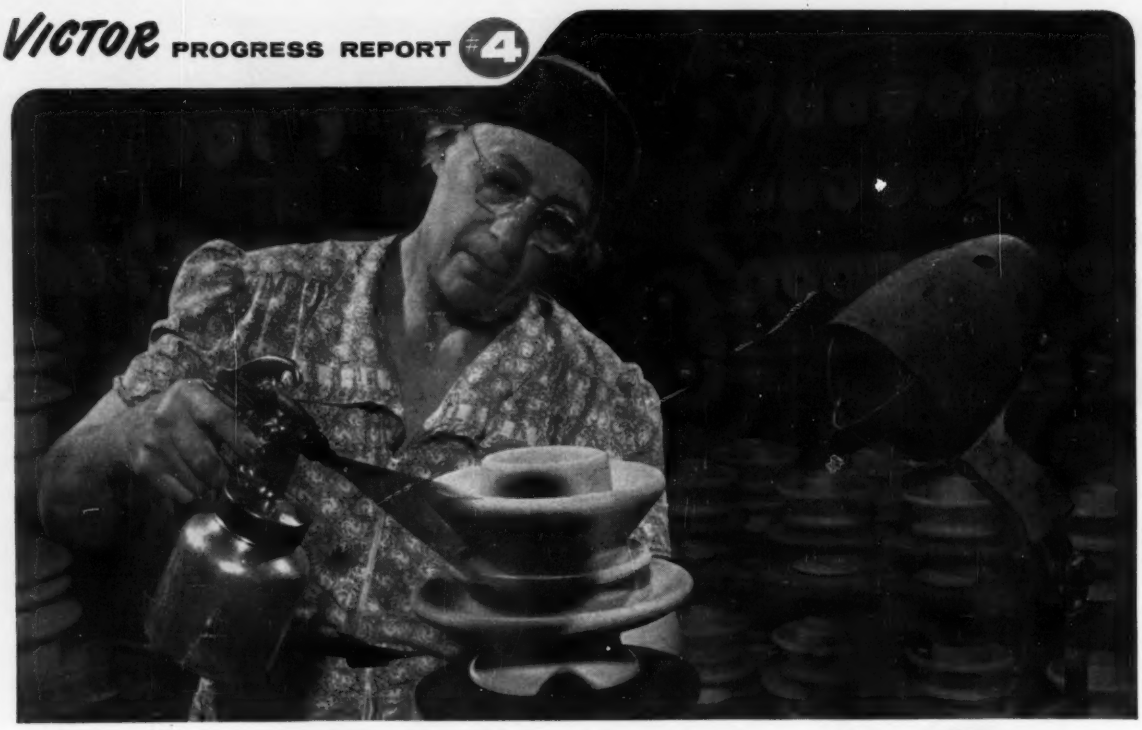
3 Eliminate disconnecting of control wires and holddown bolts.

4 Eliminate piecemeal reassembly.

CHALMERS A-C ALLIS-CHALMERS

A-5103

VICTOR PROGRESS REPORT #4



We use BLACK LIGHT to certify soundness of

VICTOR INSULATORS!

Soundness of insulator porcelain is of utmost importance to every power man. Tiny imperfections, too small for detection by eye alone, can bring about costly failure and interruption of service. VICTOR certifies the soundness of porcelain insulator bodies by the use of "black light." Before firing, insulators are sprayed with a fluorescent material, then subjected to a near ultra-violet light. This process detects the slightest imperfection in the body mass for subsequent rejection. It assures you of sound, perfect insulators, cuts costs, minimizes replacements, safeguards service. Another reason why VICTOR produces the best insulators that money can buy!

"BETTER INSULATORS THROUGH RESEARCH"

SPECIFY VICTOR

Purified Porcelain Insulators!

I-T-E

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain Insulator Hardware

MEETINGS CALENDAR

SEPTEMBER

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Meter School, Oregon State College, Corvallis, Oregon, September 10-14; Accounting Section, Cascadian Hotel, Wenatchee, Washington, September 11-14.

EDISON ELECTRIC INSTITUTE—Organization Meeting, sponsored jointly with AGA, Edgewater Beach Hotel, Chicago, Ill., Sept. 13-14; Industrial Relations Round Table Conference, Drake Hotel, Chicago, Ill., Sept. 17-19; Meter & Service Committee, Purdue University, Lafayette, Ind., Sept. 24-26.

• **ILLUMINATING ENGINEERING RESEARCH INSTITUTE**—Research Symposium on Light, Seeing, Living, Cornell University, Phillips Hall, Ithaca, N. Y., Sept. 13-15.

MARYLAND UTILITIES ASSOCIATION—32nd Fall Conference, Cavalier Hotel, Virginia Beach, Va., Sept. 14-15.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15.

AMERICAN SOCIETY FOR TESTING MATERIALS—Second Pacific Area National Meeting, Statler Hotel, Los Angeles, Calif., Sept. 16-22.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—3rd Annual Electrical Conference of the Petroleum Industry, Kansas City, Mo., Sept. 17-19; Fifth Annual Industrial Electronics Symposium, sponsored jointly with the Institute of Radio Engineers, Hotel Manager, Cleveland, Ohio, Sept. 24-25.

ILLUMINATING ENGINEERING SOCIETY—National Technical Conference, Hotel Statler, Boston, Mass., Sept. 17-21.

INSTRUMENT SOCIETY OF AMERICA—11th Annual Instrument-Automation Conference and Exhibit, New York Coliseum, Sept. 17-21.

MISSOURI VALLEY ELECTRIC ASSOCIATION—Accounting Conference, Lassen Hotel, Wichita, Kansas, Sept. 20-21.

SOUTHEASTERN ELECTRIC EXCHANGE—Engineering & Operations Section, John Marshall Hotel, Richmond, Va., Sept. 20-21.

ATOMIC INDUSTRIAL FORUM, INC—3rd Annual Forum Conference and 2nd Annual Trade Fair, Morrison Hotel and Navy Pier, Chicago, Ill., Sept. 24-28.

PENNSYLVANIA ELECTRIC ASSOCIATION—49th Annual Meeting, Hotel Wm. Penn, Pittsburgh, Pa., Sept. 25-26.

ELECTRIC COMPANIES PUBLIC INFORMATION PROGRAM—Steering Committee, Blackstone Hotel, Chicago, Ill., September 26; Workshop Conference, Blackstone Hotel, Chicago, Illinois, September 26-28.

OCTOBER

EDISON ELECTRIC INSTITUTE—Prime Movers Committee, Radisson Hotel, Minneapolis, Minn., Oct. 1-3; Area Development Committee Meeting, Oct. 3, and Area Development Committee Workshop, Radisson Hotel, Minneapolis, Minn., Oct. 4-5; Electrical Equipment Committee, Hotel Statler, Cleveland, Ohio, Oct. 15-16; Transmission and Distribution Committee, Hotel Statler, Buffalo, N. Y., Oct. 18-19.

ILLINOIS INSTITUTE OF TECHNOLOGY—12th Annual National Electronics Conference, sponsored jointly by AIEE, Institute of Radio Engineers, University of Illinois, and Northwestern University, Hotel Sherman, Chicago, Ill., Oct. 1-3.

NATIONAL ELECTRONICS CONFERENCE—12th Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill., Oct. 1-3.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5.

CANADIAN ELECTRICAL MANUFACTURERS' ASSOCIATION—12th Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada, Oct. 3-5.

INDIANA ELECTRICAL ASSOCIATION—Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 3-5.

MISSOURI VALLEY ELECTRIC ASSOCIATION—Sales and Rural Conference, Hotel President, Kansas City, Mo., Oct. 3-5.

SOUTHEASTERN ELECTRICAL EXCHANGE—Sales Conference, Tides Hotel & Bath Club, St. Petersburg, Fla., Oct. 3-5; Accounting Meeting, Hotel Seville, Miami, Fla., Oct. 10-11.

STANDARDS ENGINEERS SOCIETY—Fifth Annual Meeting, Hotel Willard,, Washington, D. C., Oct. 3-5.

INTERNATIONAL ASSOCIATION OF ELECTRIC LEAGUES—Sheraton-Cadillac Hotel, Detroit, Mich., Oct. 3-6.

• **PENNSYLVANIA ELECTRIC ASSOCIATION**—Electric Equipment Committee, Arlington Hotel, Binghamton, N. Y., Oct. 4-5; Hydraulic Power Committee, Mountain View Hotel, Greensburg, Pa., Oct. 4-5; Communications Committee Meeting, Fort Stanwix Hotel, Johnstown, Pa., Oct. 22-23; Relay Committee Meeting, Hotel Robert Treat, Newark, N. J., Oct. 25-26.

ROCKY MOUNTAIN ELECTRICAL LEAGUE—Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Oct. 7-10.

INTERSTATE POWER CLUB—Hotel Martinque, New York, Oct. 8.

ILLINOIS INSTITUTE OF TECHNOLOGY—Conference on Computer Applications, Chicago, Ill., Oct. 9-10.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—National Power Use Workshop, Milwaukee Auditorium, Milwaukee, Wis., Oct. 15-16.

IOWA UTILITIES ASSOCIATION—Annual Management Conference, Hotel Fort, Des Moines, Iowa, Oct. 15-16.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24.

AMERICAN STANDARDS ASSOCIATION—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

UNIVERSITY OF TEXAS—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

NATIONAL SAFETY COUNCIL—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS—South Central Region Meeting, M & M Building, Houston, Texas, October 23-26.

NORTHWEST PUBLIC POWER ASSOCIATION—Power Use Section, Franklin PUD Auditorium, Pasco, Wash., Oct. 25-26.

MONTANA STATE RURAL ELECTRIC COOPERATIVE ASSOCIATION—Annual Meeting, Lewiston, Mont., Oct. 29-31.

NOVEMBER

LOUISIANA POLYTECHNIC INSTITUTE—Fifth Annual Instrumentation Conference, Ruston, La., Nov. 1-2.

NATIONAL RURAL ELECTRIFICATION COOPERATIVE—Region Nine Annual Meeting, Davenport Hotel, Spokane, Wash., Nov. 12-13.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—Annual Meeting, Traymore Hotel, Atlantic City, New Jersey, Nov. 12-16.

EDISON ELECTRIC INSTITUTE—Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Accident Prevention Committee, Statler Hotel, Hartford, Connecticut, November 26-28.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—22nd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y., Nov. 25-30.

GREAT LAKES CONFERENCE OF RAILROAD AND UTILITIES COMMISSIONERS—First Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Nov. 29-30.

DECEMBER

INSTITUTE OF RADIO ENGINEERS—2nd Instrumentation Conference, Biltmore Hotel, Atlanta, Ga., Dec. 5-7.

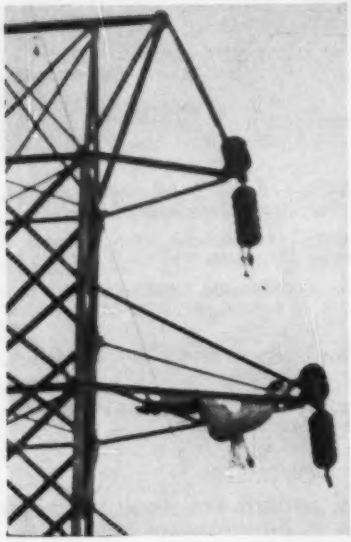
EDISON ELECTRIC INSTITUTE-AMERICAN GAS ASSOCIATION—1957 Conference Planning Committee, EEI-AGA Headquarters, New York, N. Y., Dec. 6-7.

• Additions this week.

Pictorial Glimpses of Recent News . . .

Cleanup Continues at Schoellkopf

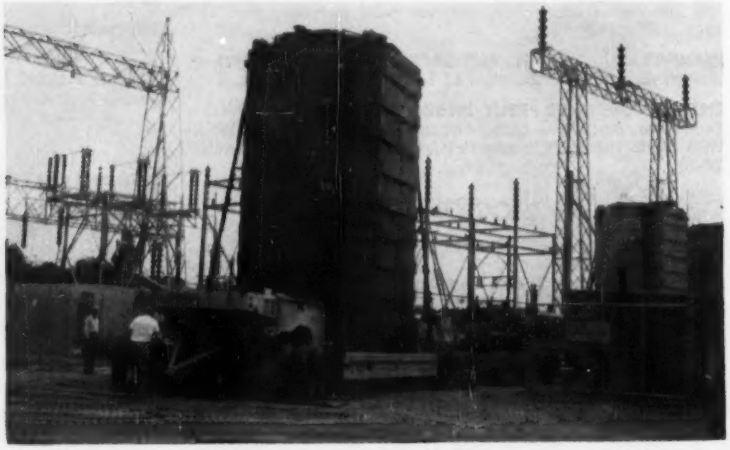
Niagara Mohawk Power Corp's Schoellkopf Station, victim of a huge rockfall June 7, remains under piles of rock as workmen use dynamite to clear away the rock in first phase of cleanup operations. The canal that fed water to the station can be seen at upper right. Schoellkopf Station is located on the American side of the Niagara River gorge just below Niagara Falls.



High Wire Kills Boy

A game of follow-the-leader led to the electrocution of a 14-year-old Pennsylvania boy recently. The youth, Michael Murtha, brushed against a 23-kv line as he neared the top of the 75-foot high tension power transmission tower of Pennsylvania Power & Light Co.

The boy, shown above lying in the framework of the tower, was killed about a half-mile from his Jenkins Township home. Both the 23-kv line and a 66-kv line on the same tower were de-energized before PP&L's crew was able to release the body.



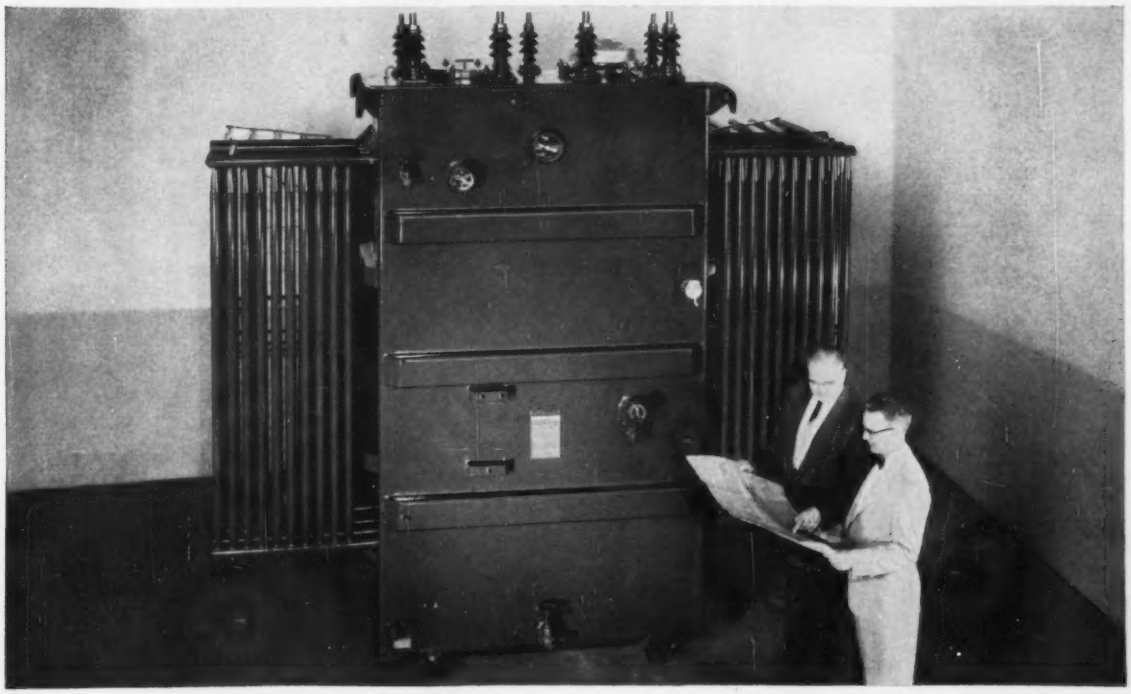
BPA Gets 600 Mva Bank for New Line

Last of the big three 345/230-kv transformers, each 36 ft high and weighing over 394,000 lb, has been wheeled into place at J. D. Ross substation in Vancouver, Wash., by Bonneville Power Administration crews. The three-unit banks, for operation of the McNary-Ross transmission line, are rated 600 Mva under forced cooling. "Operation of the line at 345 kv will more than double the present capacity of the line now operated at 230 kv," said BPA Administrator William A. Pearl. "Later installation of series capacitors will further step up capacity of the line."

Design time... five minutes

J. C. Rissinger, Manager Substation Equipment Sales, reviews design improvements with Gordon Monroe, Section Mgr., Engineering Department . . . many made possible by freeing engineers from routine design calculations.

WESTINGHOUSE ENGINEERS are now designing mathematically perfect power transformers with new IBM-705 electronic computers . . . in minutes.



Automation has come to transformer design. Two new Westinghouse computers telescope design time to just short of nothing. That's important because designing a well-balanced transformer has been a complex and time-consuming job. Now, such factors as impedance, losses, sound level, temperature rise and dielectric strength are all integrated into product design—automatically, literally in 5 minutes.

The exclusive application of this Westinghouse pioneered innovation to the complete design of power transformers means products of mathematically perfect quality.

Specification and purchasing are simpler. Exact design information is right on hand at the time the order is negotiated. Eliminating 99% of our design time means you get faster delivery.

The time of, literally, dozens of engineers is being made available for creative development work on new and better transformers. Even when product performance already represents industry leadership, you can depend on Westinghouse to introduce new ideas that make any Westinghouse transformer a better buy.

Get in touch with your Westinghouse sales engineer, today, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70767

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

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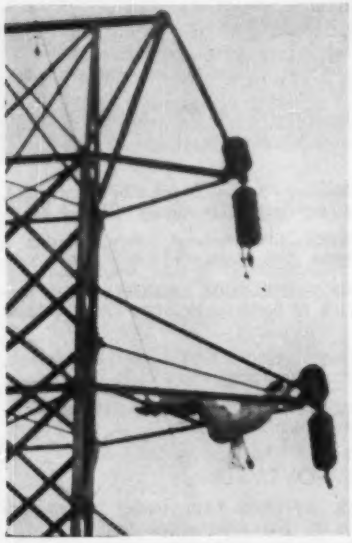

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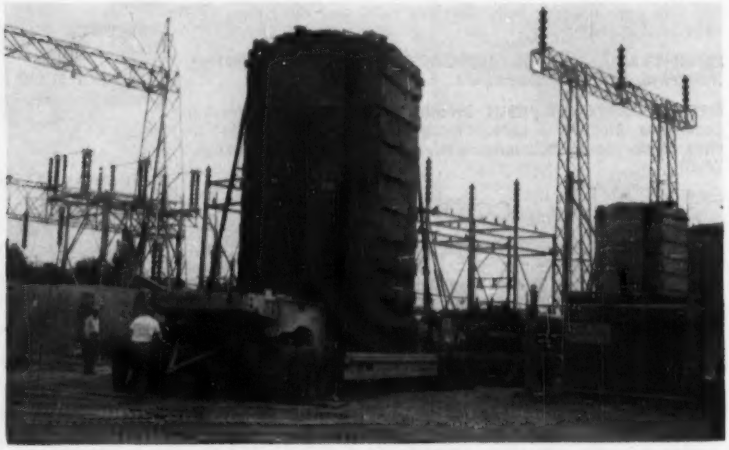

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WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

Helping the industry meet its growing loads

New 5000-psi turbine-generator will produce world's most efficient kilowatts

In the battle to reduce costs per kilowatt hour, Westinghouse has just scored another victory for electric utilities with a new world-record turbine. This giant unit now on order by Philadelphia Electric Company will operate at a pressure, temperature and efficiency that will surpass all other machines now operating or on order.

Substantial performance gains are expected from the Philadelphia Electric Company turbine. A plant heat rate approaching 8000 Btu's per kwhr will be obtained. This is an efficiency improvement of over 10% above present stations.

Every day Westinghouse research and development works to advance the frontiers of steam progress even further. There is no end to the effort of progressive Philadelphia Electric Company—and the entire electric Utility Industry to meet the mushrooming demand for power—a demand that has doubled every decade. This constant advancement will keep electrical energy today's best buy . . . tomorrow's, too. J-97196

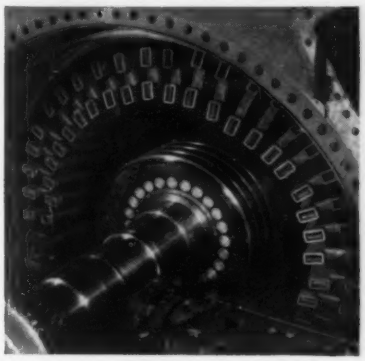
WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

Super critical unit

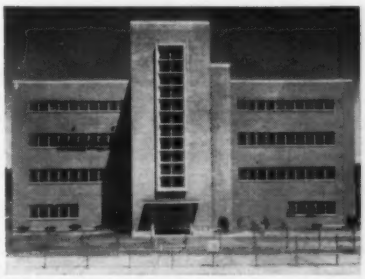
The new 5000-psi, 1200° F. turbine for Philadelphia Electric Company is a cross-compound, four-cylinder unit. It will use double-flow exhaust to the condenser and double reheat to 1050° F.

The two Westinghouse generators will have a combined rating of 416,000 kva, three phase, 60 cycle, 20,000 volts. They will be self-ventilated with shaft-mounted fans, and will employ hydrogen inner-cooling of rotor and stator conductors.



Inner-cooling

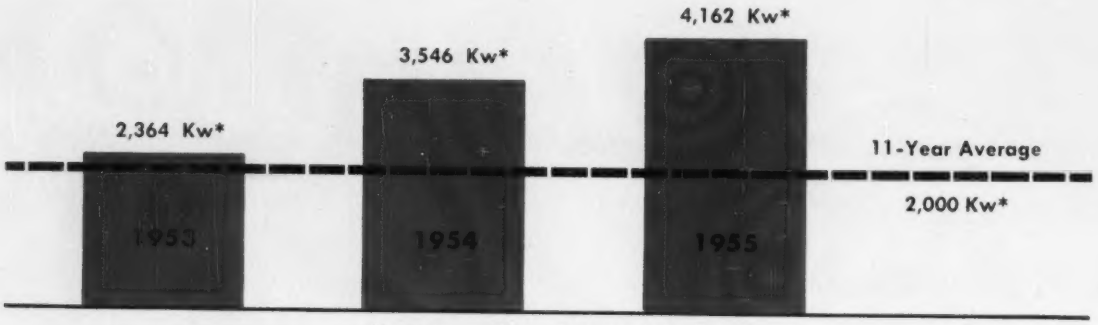
Generator inner-cooling represents a tremendous advance in dissipating heat from current-carrying windings. By actually circulating hydrogen *inside* both rotor and stator conductors, Westinghouse engineers have doubled single shaft ratings over conventionally cooled units with greatly reduced size and weight. Already proved in extensive service, inner cooling has become the *key* to even greater generator ratings at a saving in cost. Without the use of inner-cooled conductors, it would be impractical to build the large capacity generators required by the utility industry today. Well over 10,000,000 kva of inner-cooled generators are presently on order at Westinghouse.



Turbine laboratory

Advanced development on steam and gas turbines is being conducted at the new Westinghouse laboratory near Philadelphia. Here, amid facilities that are the most modern in the world, engineers and technicians work to advance the prime-mover art. Out of this laboratory will come the great turbine developments of the future that will help the utility industry produce kilowatts at lowest possible cost and keep Westinghouse in the vanguard of steam turbine progress.

The Poor Little Rich Load Gets Richer . . .



(Average per Year per Utility in Study)

* 1953 figure is average for 61 utilities that reported sales, 1954 and 1955 figures are average for 64 utilities, 11-year average is for 54 utilities.

- New commercial electric cooking kw moves upward each year (chart above)
- In 1955 new estimated annual revenue from commercial cooking averaged $87,519
- The 11-year average kw per 10,000 commercial-industrial meters climbed to 7,233 kw

To Get These Results, Reporting Utilities . . .

- Budgeted $17,241 for commercial cooking in 1955 (including salaries)
- Spent $13.30 per food service account
- Paid out 27.5¢ for each $1 of commercial cooking Estimated Annual Revenue

A look at the figures above shows what is happening to commercial electric cooking. Since Electrical World's first survey (EW, March 21, 1955, p 115) more utilities have gotten into the business. Those that have been in it are spending more money, employing more people to sell it. And the revenues gained are going up accordingly. Evidence:

• The average utility of the 67 studied in this second survey added an average 4,162 kw of commercial cooking load in 1955 compared with 3,546 kw in 1954 and 2,364 kw in 1953.

• In revenues, this amounted to $87,519 for the year (based on reports supplied by 57 utilities and an estimated annual revenue value of $25 per kw.)

• Over the 11 years from 1945 through 1955 it has put an estimated 22,224 kw of commercial cooking load on its lines. This amounts to roughly 2,000 kw per year—less than half the pace at which it is being added now.

• Some 7,233 kw per 10,000 commercial-industrial meters were added in those 11 years (based on 54 utility reports). Using the traditional rule of thumb that one in ten are food service accounts, this averages about 2/3 of a kw per food service account per year—again less than half the current rate.

Commercial electric cooking has become a multi-million dollar business. Growth has been rapid of late. About four years ago Pennsylvania

(*Continued on page* 38)

ABOUT THE FINER POINTS OF METERING...

For better protection against lightning surges

The most common cause of a watthour meter speeding up in service is that the damping magnets have lost some of their strength. Lightning surges and short circuits can de-magnetize even the best chrome steel magnets.

That's why Sangamo J2 Meters are equipped with small, powerful, highly surge-resistant *Alnico* damping magnets. These magnets are extremely stable because they are magnetically and heat aged. These better magnets provide the damping for the higher torque and lower speed of the Sangamo J2—your best investment in a watthour meter.

The J2 meter is the SLOW SPEED meter

At full nameplate rating, the J2's disk makes only 10 revolutions per minute. *This is many times slower than the disk speed of any other watthour meter on the market today.* And slow speed is *one* of the reasons why the J2 lasts longer . . . gives you more years of trouble-free service.

JM56-5

SANGAMO

ELECTRIC COMPANY Springfield, Illinois

How Does Your Commercial Cooking Organization Compare with This?

The Average Utility in This Study . . .

- Has aggressively promoted cooking for more than 13 years.
- Has 30,979 commercial meters plus 2,283 industrial meters of which an estimated 2,331 of them are food service prospects.
- Employs 1.1 commercial cooking specialists plus 16.6 all-purpose representatives who spend nearly one-fourth of their time (24.3%) selling commercial cooking.
- Puts a total of 1.5 man-years into commercial cooking promotion per 10,000 commercial-industrial accounts.

But Most of the Utilities Studied . . .

- Do not merchandise commercial cooking (only 16% do, another 10% partially) and . . .
- 30% of them maintain separate commercial cooking departments.

Power & Light Co became the first company to build cooking revenue into a million-dollar-a-year business. Today, the roster includes PP&L and Appalachian Electric Power (both now well over $2 million), Ohio Power, Ohio Edison, West Penn Power, Atlantic City Electric, Duke Power, Carolina Power & Light, and Northern States Power Co's.

Over $200,000 Yearly

Added to this there are eight utilities which are increasing revenue at the rate of $200,000 or more annually. One, Southern California Edison Co picked up nearly $500,000 last year, and Appalachian Electric Power —a much smaller company—was only a hair's breadth from $400,000.

Back of this kind of results are four principal elements:

1. Adequate budgets.
2. Solid organization.
3. Enlightened policies and aggressive sales activities.
4. Hearty blessings from top management.

Size of commercial cooking budgets appear to have come down a bit in 1955 compared with 1954. The 27 utilities who could report budgets for last year spent an average $17,241. This amounted to $13.30 per food service account vs. $14.94 the year before, and 27.5¢ per $1 of commercial cooking EAR compared with 32.2¢ in '54. Since so few utilities could report their budgets, these average figures are likely on the low side. Only 27 could report total sales expense, 25 expense per account, and 26 sales cost per $1 of EAR.

Big Budgets, Big Sales

While a sizable number of utilities are garnering fair-size business on shoestring budgets, there's adequate proof that where the utility chooses to make an investment commensurate with opportunity, new loads far above the average can be added to its lines. A good example is Atlantic City Electric which exploited a comparatively small market (2,000 customers), to the tune of more than $100,000 in new revenue last year. The cost: Only 39.2¢ per $1 of new EAR.

Hand in hand with budgets goes organization. The average utility's commercial cooking background and its organization for selling goes something like this:

Manpower—It has 1.1 full-time commercial cooking specialists plus 16 other men who give about a quarter of their time to it. This is a little more than 1.5 men per 1,000 food service accounts. Manpower, like budgets, has been getting smaller. The first study showed 2.14 men per 1,000 accounts. As to be expected, there is a direct relationship between amount of manpower and results. The ten companies adding the largest loads had an average 2.5 men per 1,000 food service customers; the 10 lowest reporting their results, only 0.51. Some 30% of all the utilities find it pays to maintain separate commercial cooking departments.

Experience—The veterans, it seems, do the most effective jobs. The top 20 companies in the study have been at it for an average 17½ years, the 20 lowest 7½ years. Average for all is 13.3 years. This would indicate that it takes time to build a good foundation. On the other hand, "crash" programs can sometimes bring immediate results, too. Gulf States Utilities, located deep in the natural gas area, and with only four years in the game is a dramatic example. In 1953 it added 1,870 kw. By 1955 this had jumped to 5,354 kw.

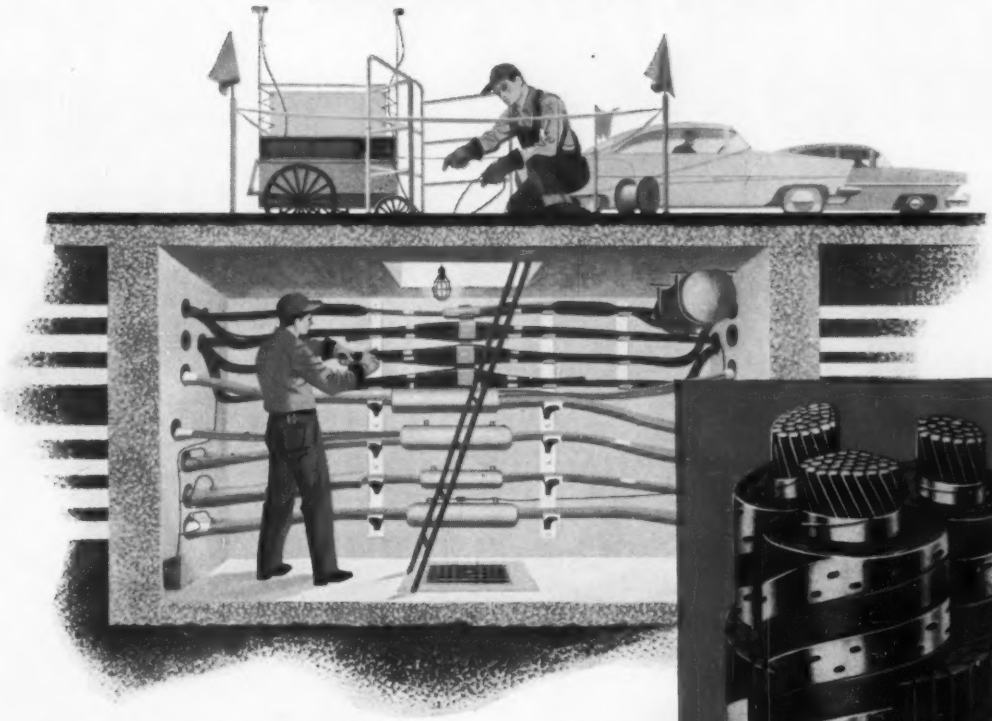
Little Direct Merchandising

Merchandising—The trend is definitely away from merchandising by the utility itself and towards stronger dealer cooperation. Only 16% of those surveyed do, plus another 10% which are partially engaged in it. Georgia Power, for example, quit direct merchandising in 1954, built up its dealer relations, and sales went up from 6,456 kw to 11,124 kw—an increase of 72.5%. Atlantic City and Potomac Edison still are active in merchandising, but at the same time they maintain strong dealer cooperative programs.

(*Continued on page* 42)

OK! You want a longer-lived cable!

YOU'LL GET IT, WITH ROEBLING PAPER POWER CABLE WITH TELLURIUM LEAD ALLOY SHEATH



ROEBLING ELECTRICAL WIRES AND CABLES ARE AVAILABLE WITH EITHER COPPER OR ALUMINUM CONDUCTORS

1—SUPERLATIVE FATIGUE RESISTANCE. With today's high operating loads and temperatures, cables periodically move and bend more than previously. Fatigue cracks develop and cause premature failure of ordinary sheaths.

Tests conducted in temperature-controlled ovens on full cable sections at 150°F, one cycle per minute and at a bending radius of 7 times the cable diameter, show that Roebling tellurium lead alloy has 4½ times the fatigue resistance of copper-bearing lead in the range of service strains!

2—LOWEST LONG-TIME CREEP RATE. Many cables today employ low viscosity impregnating compounds that tend to migrate and accumulate on steep profiles. Still other cables are gas filled at low or medium pressures. For all these types a creep-resistant sheathing material is essential for long service life.

Tests conducted at 200 psi, 150°F, for a period of 4,000 hours, show that Roebling tellurium lead alloy has only one-tenth the creep rate of copper-bearing lead!

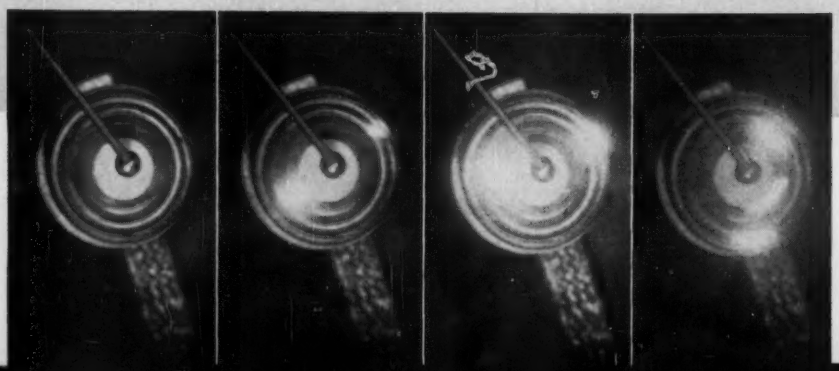
Write for full information about Roebling Paper Power Cable with Tellurium Lead Alloy Sheath . . . the most important sheath development in years.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 11-15 STILLING ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

W. J. RUDGE, *Mgr*—Lightning Arrester and Cut-out Engineering, points to newly designed Magne-valve gap—the reason for General Electric's smaller, lighter distribution arrester. Both types, directly connected (standing) and externally gapped (on table) use exclusive Thyrite* Magne-valve operating principle.



HI-SPEED, EFFICIENT ARC INTERRUPTION

Movie frames show how rapid rotation of arc and extinction of follow current in less than one-half cycle prevent localized heating—help the new Magne-valve arrester protect against subsequent surges.

Here's why General Electric's

NEW MAGNE-VALVE DISTRIBUTION ARRESTERS

pack more protection in less space

General Electric's new Thyrite Magne-valve distribution arresters are the smallest and lightest valve arresters on the market today. Some ratings are as much as **40% lighter** than competitive models. These features make the arresters easier to stock, handle and install—help to eliminate clearance problems.

Operating principle. In order to obtain smaller size and lighter weight, General Electric engineers have applied exclusive Magne-valve action to these arresters. A space-saving, concentric ring gap unit was designed to pack more protection in less space. Like the service-proven Magne-valve station- and line-type arrester gap units, the new distribution arrester gap helps maintain consistent spark-over voltage and assures efficient power-current arc interruption.

High discharge capacity. These arresters also have capacity for high discharge currents exceeding that of any other distribution arrester. They easily withstand the 65,000-amp AIEE standard discharge current test. Also, long duration discharge and duty-cycle tests have demonstrated their superior performance under all conditions. Both types provide positive line-lockout prevention.

Two types. General Electric offers you a choice of two types, directly connected with ground-lead disconnect or externally gapped. Every arrester in both series offers complete system protection and many advantages over expulsion arresters—including better impulse protection, longer service life and universal application anywhere on the system regardless of short-circuit capacity. Ratings from 9- thru 18-kv are available in both types. Dependable G-E pellet arresters are still available for voltage ratings of 3- thru 15-kv.

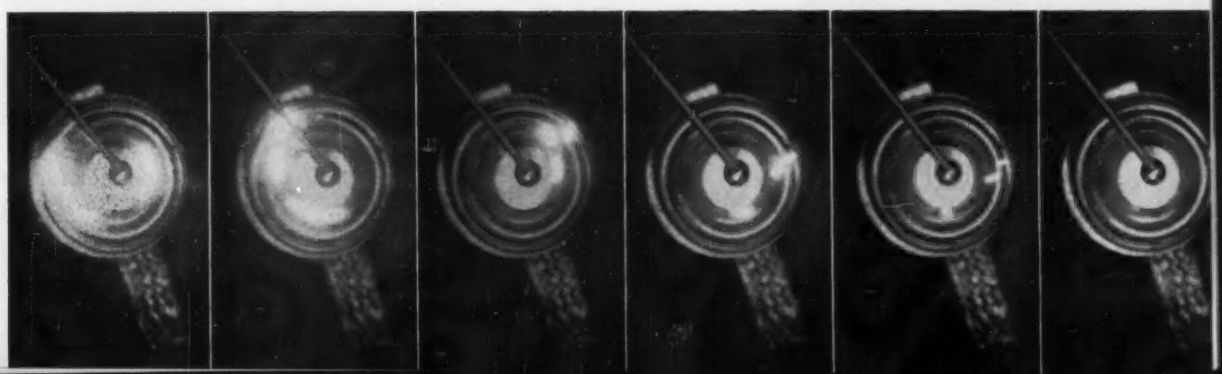
For complete information on this new line of G-E distribution arresters, call your nearest G-E Apparatus Sales Representative or write for bulletin GEA-6379, General Electric Company, Schenectady 5, New York. 432-18

LIVE BETTER ELECTRICALLY

**Registered Trade-mark of General Electric Company for molded resistance material*

Progress Is Our Most Important Product

GENERAL ELECTRIC



Do You Use These Selling Methods?

At Least ¾ths of the 67 Leading Utilities Surveyed . . .

	% Do	% Don't	% Partially
Work with dealers (furnish leads, make calls with dealer salesmen, etc)	91	7.5	1.5
Instruct buyers in use and care of new equipment	88	7.5	4.5
Conduct annual commercial cooking training for their representatives	85	12	3
Have mailing list of all food service accounts and revise it annually	80	17	3
Use direct mail advertising at least quarterly	79	13.5	7.5
Mail "Food Service" magazine to a minimum 30% of food service accounts	79	12	9
Have counter equipment for demonstration and "loaner" purposes	78	19	3
Contact key architects quarterly	77.5	18	4.5
Contact all prospects semi-annually	76	19.5	4.5
Offer free trial installations of counter equipment	75	25	. . .

Half of Them or More . . .

Stage spring and/or fall sales campaigns	73	25.5	1.5
Maintain local photo and testimonial files	73	22.5	4.5
Service equipment	67	26	7
Survey customers and revise annually	61	39	. . .
Provide kitchen layout service	61	30	9
Hold group prospect meetings at least twice a year	53.5	39	7.5
Subscribe to and follow-up "Dodge-Reports"	52	43	5

Less Than Half . . .

Display equipment and/or have model kitchen	46	46	8
Have heavy-duty equipment for demonstration and "loaner" purposes	28.5	62.5	9
Offer free-trial installations of heavy-duty equipment	22.5	67	10.5
Have incentive plan or special activity for dealer salesmen	22.5	77.5	. . .
Have incentive plan for utility representatives	21	79	. . .
Finance wiring	15	83.5	1.5
Offer wiring subsidy	13.5	86.5	. . .

Customers—The average utility in the study has a little over 33,000 commercial-industrial meters of which 2,300 or about one in 14 of them are estimated to be food service operations.

As a basis of comparison, this one in 14 average has been applied to each utility in the study. Beginning on page 46 are four pages of charts showing precisely what the individual utilities surveyed do to sell commercial cooking and the results they are getting. Utilities are listed in order of the kw added per 14 commercial-industrial meters in 1955. At the top is Atlantic City Electric which put an average 5.01 kw into each of its food service establishments. It is followed by Appalachian Electric Power (4.07 kw), Texas Power & Light (3.79 kw), and Potomac Edison (3.74 kw). Average for all utilities was 1.89 kw.

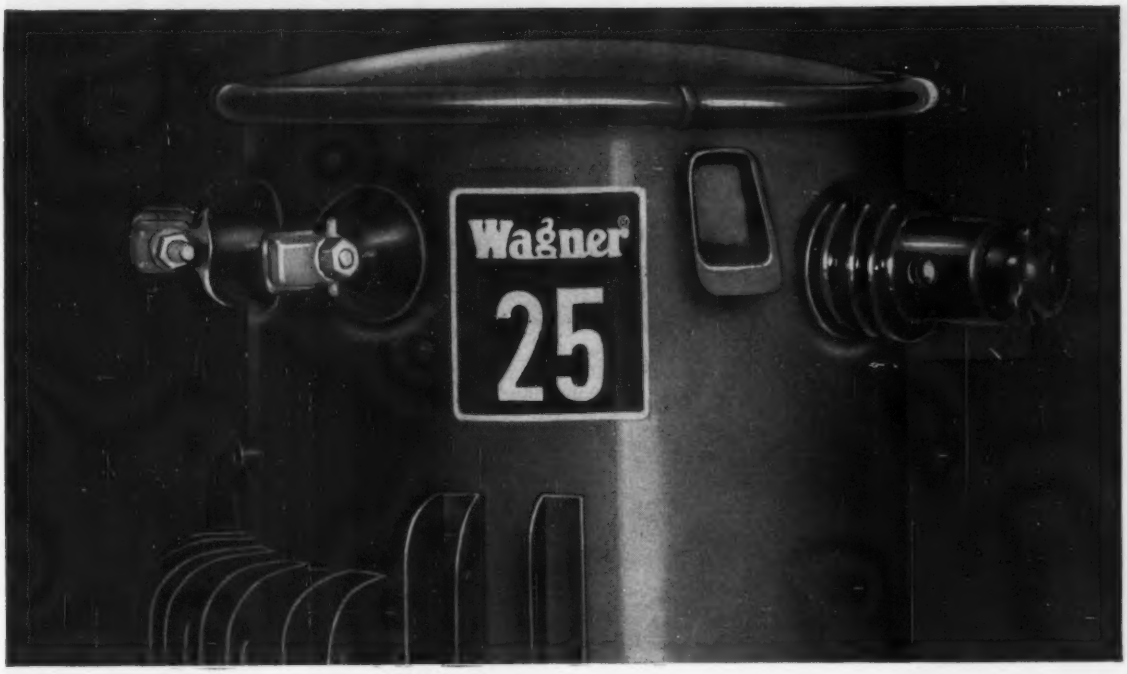
Use 24 Sales Methods

The charts also rate the utilities in terms of program points and index number. Program points are based on the 24 policies and sales activities which in the minds of sales authorities pretty well cover all possible commercial cooking promotional activities a utility can undertake. To arrive at a program rating, each utility is given one point for each of the program points it employs, ½ point for partial employment, and one point for each man assigned to implement the program. The average utility had a program rated at 16.24 program points. The ten utilities with the highest kw added per customer all had programs in excess of this. The leader in this group, Ohio Power Co, is rated at 23.34 points, followed by Pennsylvania P&L with 22.22.

The index number at the bottom of the charts refers to the efficiency of the program, ie, the results it delivered in relation to the money and manpower expended.

Of the 24 program points (table at left) the most commonly used selling practice is dealer cooperation. Majority of utilities also lean on direct mail advertising and yearly cooking sales training for their representatives. Potency of the free-trial installation as a sales weapon is demonstrated by the 50 utilities who say they make

(*Continued on page* 45)



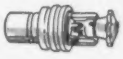
Wagner Form W Transformers

offer smaller size—lighter weight—sealed tank construction—key-locked safety bushings

Wagner Form W Distribution Transformers, with wound cores and improved insulation, are now considerably smaller in size—lighter in weight than ever before. Yet they are liberally designed for excellent electrical performance—low core and copper losses—good regulation—high overload capacity for peak loads. Sixty-five years of transformer manufacturing experience are your assurance of Wagner dependability. Specify Wagner for your lines—get these proven features:

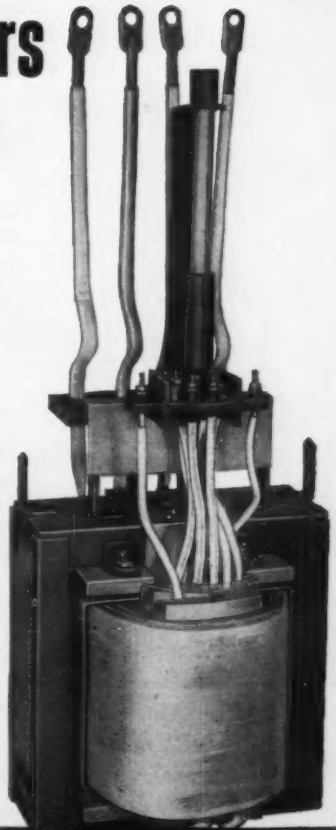
Only Wagner offers the Shur-seal cover design that keeps the transformer as air-tight as a welded tank, yet lets you remove the cover by loosening a single bolt.

Low voltage bushing and terminal are key-locked to prevent turning when tightening. Reduces danger of internal shorts. Takes copper or aluminum conductor.



High voltage sidewall bushing is safety-designed for insulated knob connection. Takes either copper or aluminum conductor. Porcelain and terminal are locked in position.

New Form W Element with cold-rolled wound core. Thermosetting insulation bonds coil element into a solid unit, braced to prevent shifting inside tank.



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6456 Plymouth Avenue, St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
EST. 1891

T56-13

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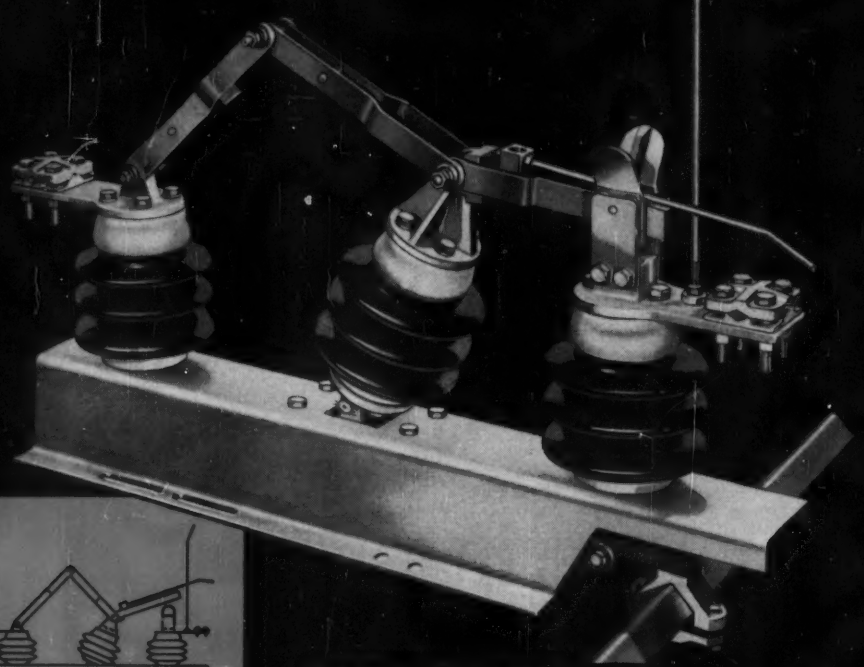
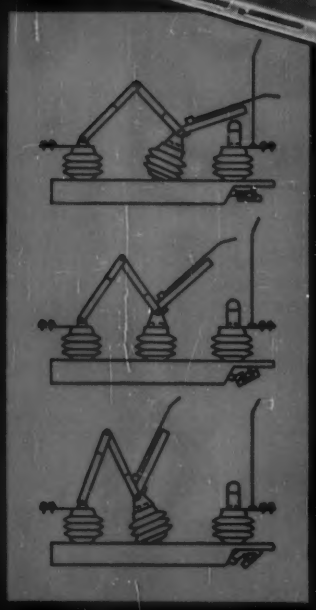
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

Compensates for warped crossarms





KEARNEY *Tilting Insulator* GANG SWITCH

Even if the switch poles should be pulled far out of line by crossarm warpage, this KEARNEY switch closes tightly . . . opens easily. The specially designed interphase shaft clamp compensates for structural distortion. This switch also has KEARNEY's exclusive "pry-out" opening action that will break even the heaviest coating of ice. And, for long-lasting dependability, notice that there is no braid shunt to rot out. The heavy, high-conductivity pantograph hinge carries the current.

JAMES R. KEARNEY CORPORATION • 4224-42 Clayton Ave., St. Louis 10, Mo. • *Canadian Plant:* Guelph, Ontario

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for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

The Mark of Quality

KEARNEY PRODUCTS

this service available on counter equipment. And while free trials on heavy duty equipment still lag, the gap is being narrowed. Necessity of having a strong service program to support the selling effort is also borne out. Forty-five utilities report that they themselves service their customer's equipment.

Another selling device which is gaining popularity: Display equipment and model kitchens. Good example is the demonstration kitchen shown at right recently opened by Kansas Gas & Electric Co in its Wichita headquarters. More and more utilities also are mobilizing their displays, taking their pitch right to the prospect's door. Potomac Edison's commercial cooking cruiser (below) is a converted second-hand bus fitted with every type of heavy duty device except ovens. On its very first stop last June, three large pieces of equipment were sold.

Wiring subsidies and wiring finance plans are the least used selling tools, but there is a trend towards greater use of them. Heaviest wiring subsidies in the study are given by Gulf States Utilities and Iowa Electric Light & Power Co. Both dole out an average of $6 per kw of equipment installed.

Some surprises:

- Twenty-six utilities either haven't made a survey of their food service market or don't revise it annually.
- Utilities manage to visit architects more frequently than they do their customers. Added to this, 20% of them do not even call on their prospects twice a year. This reflects the tight manpower situation that exists in commercial cooking sales today.

'56 Sales 25% Ahead

For 1956, commercial cooking sales look good. One estimate puts utility loads to be running a full 25% ahead of last year. And from all appearances, some utilities may add as much as 20,000 kw this year. At the end of July Appalachian had already sold 12,000 kw of new equipment and Pennsylvania P&L was just under the 11,000 kw mark.

Beginning on next page . . . 67 utilities show what it takes to sell cooking

Sales by demonstration: In the office and . . .

. . . on wheels it is a potent weapon

Commercial Cooking: What Utilities Do to Sell It

ORGANIZATION	Atl. City	App. E P	Tex. P&L	Pat. Ed.	Car. P&L	Minn. P&L	Penn. P&L	Ohio Pwr.	EP Bd. Chat.	Kgspt Util.	Ky. Pwr.	Attle. Elec.	N.Brk Elec.	Ohio Ed.	Wash. W.P.	West Penn.
Yrs CC Promoted	7	7	7	31	20	20	9	24	17	10	26	20	1/2	19	40	24
Merchandises CC (% territory)	100	No	No	100	No	50	No	No	No	No	100	No	No	No	No	No
Comm Meters (1,000)	24.2	49.7	31.6	17.0	38.4	7.4	71.6	47.4	6.6	1.9	10.5	1.6	1.9	55.0	14.14	32.6
Ind Meters (1,000)	.16	3.1	6.69	.23	1.8	.55	4.8	2.7	.8	.04	1.19	.15	.03	.89	.69	5.0
Food Serv Cust (1,000)	2.0	2.3	1.7	1.4	3.5	.48	5.6	3.1	.6	NA	.65	.1	.14	4.8	.8	3.0
Has CC Specialists	1	4	No	1	No	No	2	No	1	No	4	No	No	2	No	1
No. All-Purp. Reps /% Time on CC	10/25	21/20	23/25	7/33 1/3	8/100 16/50	7/25	48/30	47/25	2/80	2/20	5/30	1/5	2/30	27/5	12/15	18/25
Man-Years per 10,000 Comm-Ind Cust	1.43	1.55	1.49	1.93	3.96	4.66	2.16	2.34	3.51	2	4.7	.29	3.06	.60	1.21	1.20
BUDGET																
Sales Exp ($1,000)	$39.4	NA	NA	NA	NA	$11.8	NA	NA	$15.0	NA	NA	NA	NA	NA	NA	NA
Sales Exp/Cust—($)	$19.73	NA	NA	NA	NA	$24.40	NA	NA	$25.00	NA	NA	NA	NA	NA	NA	NA
Avg Sales Exp ¢/$ of CC EAR	39.2c	NA	NA	NA	NA	19.7c	NA	NA	36c	NA	NA	NA	NA	NA	NA	NA
POLICIES																
Survey Customers	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Use Mailing List	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Part	Yes	Yes	No	Yes	Yes	Yes	Yes
Dem/Loaner Counter Equip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Part	Yes
Dem/Loaner Heavy-Duty Equip	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No
Service Equip	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes
Followup Dodge Rpts	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	Part	No	No
Kitchen Layout Serv	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
Incentives for Reps	Yes	No	No	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No
Wiring Subsidy ($/Kw)	$5	No	No	$4	No	No	No	No	$4	No	No	No	No	No	No	No
Finance Wiring	No	No	No	Part	No	Yes	No	No	Yes	No	No	No	No	No	Yes	No
PROGRAM																
Annual Rep Training	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Part	Yes	Yes
Dealer Cooperation	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
See Cust Twice Yr	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
See Archts Quarterly	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Part	Yes	Yes
Direct Mail Quarterly	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes
Free Trials—Counter Equip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes
Free Trials—Heavy-Duty Equip	No	No	Yes	Yes	Part	No	Yes	Yes	No	No	Yes	No	No	No	No	No
Prospect Meetings (min twice yr)	Yes	Yes	Yes	No	Yes	Yrly.	Yes	Yes	No	No	Yrly.	No	Yes	Part	No	Yes
Spring/Fall Drives	Yes	Yes	12 mos	No	Spr.	Spr.	Fall	Both	No	Yes	Yes	Both	Yes	Fall	Spr.	Yes
Dealer Incentives	No	No	No	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No
Use & Care Instruct	Yes	Yes	Yes	Yes.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Mail "Food Service" to 30% of Cust	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Testimonial/Photo File	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Part	Yes	Yes
Display Equip/ Model Kitchen	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Part	No	Yes	No	No	Part	No	No
RESULTS																
CC Kw Added—1955	8,726	15,360	10,396	4,607	10,617	2,000	18,345	12,033	1,700	439	2,405	358	349	9,695	3,495	6,317
CC Kw Added—1954	8,004	15,635	8,204	3,911	10,402	1,900	16,889	11,812	1,890	458	1,950	334	198	9,037	3,858	5,657
1955 CC EAR ($1,000)	100.6	392.0	311.9	115.0	210 0	60.2	271.5	219.9	34.0	11.0	72.0	5.4	3.8	242.3	62.9	140.0
Est CC Kw Added—1945–1955	41,624	83,000	NA	32,963	60,000	16,000	107865	73,911	12,460	3,500	14,970	1,700	800	60,700	NA	49,625
RATINGS																
CC Kw Added per 14 Comm-Ind meters '55	5.01	4.07	3.79	3.74	3.68	3.47	3.36	3.35	3.21	3.09	2.87	2.86	2.49	2.42	2.39	2.35
Program Quotient	17.43	19.55	20.49	20.43	19.46	19.16	22.22	23.34	18.51	17.0	24.2	4.29	18.06	10.60	13.71	16.2
Index Number	251.0	181.1	160.2	159.1	164.3	157.7	131.2	125.0	150.7	157.7	103.2	583.6	119.7	198.4	151.3	126.3

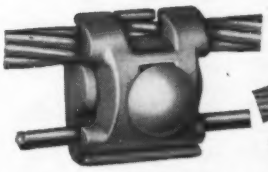
Reduce Inventory!

USE BLACKBURN'S PermaCad Aluminum Fittings

CHECK THESE PLUS FEATURES

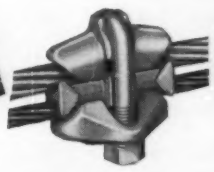
- All fittings may be used on either aluminum or copper conductors. Each fitting accommodates a wide range of wire sizes—few fittings are needed in stock or on trucks.
- Installation errors are eliminated on bi-metallic connections. Either groove will accommodate aluminum or copper conductors.
- Permacad fittings are available in one or two bolt parallel groove clamps—single and double U-bolt clamps. There's a fitting for every job.
- Grooves are contoured to surround conductor and provide large contact areas . . . improving conductivity.
- Non-copper-bearing, heat treated aluminum alloys used in all castings. Hardware available in either hot dipped galvanized steel or high strength aluminum alloy. Bolts alumilited to prevent seizing.

* **PERMACAD** *is a complex, heavy duty plating of cadmium and other metals which has exceptionally long life. PERMACAD protects aluminum because of its favorable electrogalvanic potential and is highly resistant to galvanic corrosion when in contact with copper.*

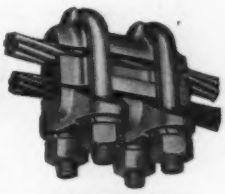


PGP SERIES
One bolt parallel groove clamp. Three fittings accommodate wire ranges from 8 AWG to 397.5 MCM.

PGP 400 SERIES
Two bolt parallel groove clamp. One clamp accommodates conductors from 1 str to 400 MCM.



DLC GP SERIES
Single U-bolt clamp. Four clamps accommodate wire range from 6 AWG to 266.8 MCM.



2U GP SERIES
Double U-bolt clamp. Six clamps accommodate conductors from 1 str to 397.5 MCM.

BLACKBURN PermaCad FITTINGS

IMPORTANT: We recommend the use of CONTAX on all aluminum and bi-metallic connections. CONTAX is an oxide inhibiting compound with an ASTM drop point in excess of 500° F.

AVAILABLE THROUGH ELECTRICAL DISTRIBUTORS EVERYWHERE

JASPER BLACKBURN CORPORATION
35 MADISON ST. • ST. LOUIS 6, MO. • PHONE MAIN 1-2821

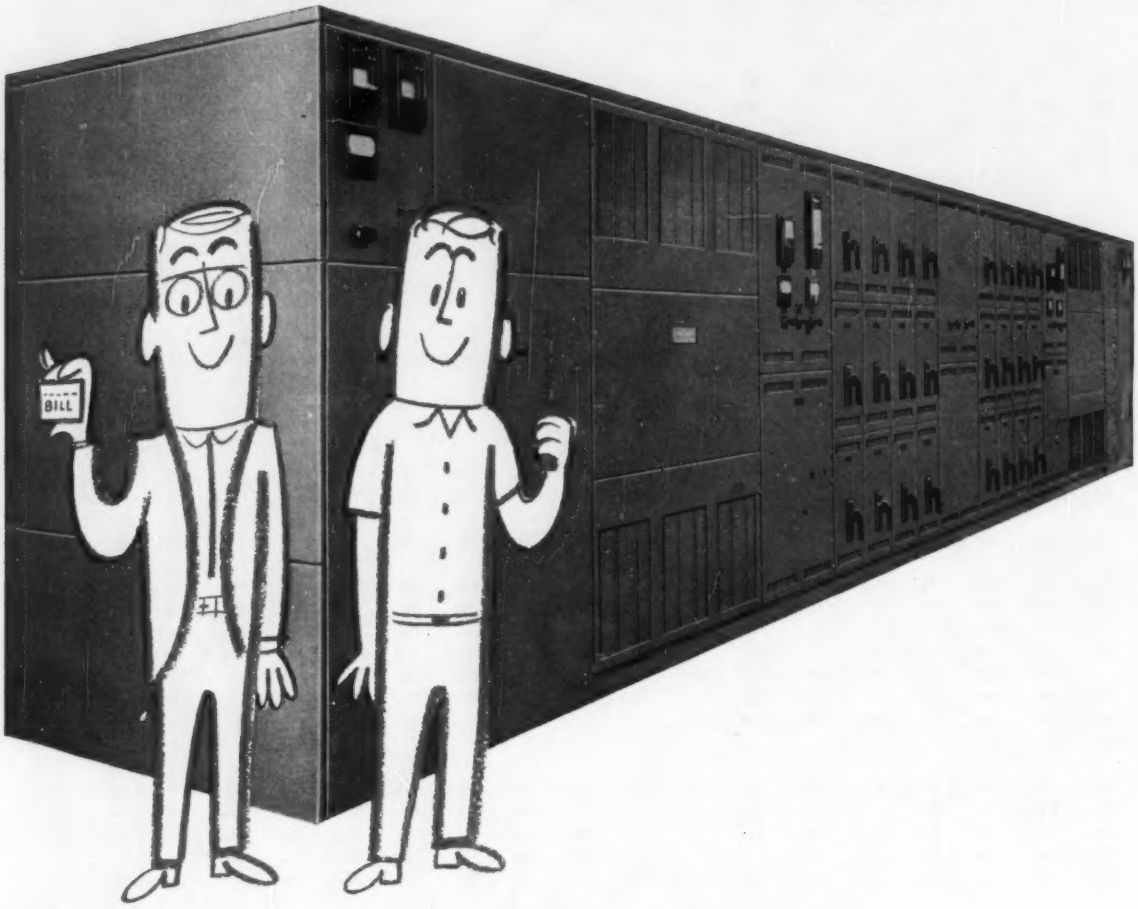
Commercial Cooking: What Utilities Do to Sell It (continued)

ORGANIZATION	Gulf Sts.	Met. Ed.	Tol. Ed.	Utah P&L	Sub. Elec.	Lwll Elec.	Ga. Pwr.	N.Y.S. E&G	Duke Pwr.	North Sts.	Wisc. P&L	Omha PPD	Kan. G&E	Wcstr. Co. E	Wis. PS	Ess. Co. E
Yrs CC Promoted	4	21	9	25	2	20	25	27	6	5 1/2	9	32	5	23	20	5
Merchandises CC (% territory)	No	No	No	No	No	100	No	25	No	25	100	No	No	100	100	100
Comm Meters (1,000)	31.5	26.4	17.1	16.7	6.3	3.9	56.8	40.5	76.0	71.4	22.3	11.0	15.1	18.4	15.11	4.6
Ind Meters (1,000)	1.0	2.7	2.5	2.9	.34	.12	16.1	1.5	1.1	1.5	.2	.75	1.6	.90	.86	.13
Food Serv Cust (1,000)	1.0	2.5	.95	NA	.36	.30	4.6	2.0	3.3	4.5	2.0	.60	1.0	1.1	.77	.30
Has CC Specialists	No	No	1	NA	1	No	1	No	No	6	1	1	1	1	No	1
No. All-Purp. Reps /% Time on CC	20/12	15/20	5/10	17/20	NA	4/25	40/20	20/10	5/80	20/10	23/9	12/5	13/18	15/10	12/30	1/15
Man-Years per 10,000 Comm-Ind Cust	.74	1.03	.76	1.72	1.49	2.46	1.23	.48	.52	1.1	1.36	1.35	1.99	1.29	2.25	2.61
BUDGET																
Sales Exp ($1,000)	NA	NA	$12.4	NA	$8.5	$6.5	NA	$18.0	NA	NA	NA	$10.5	$21.4	NA	NA	$5.2
Sales Exp/Cust—($)	NA	NA	$12.63	NA	$24.00	$21.50	NA	$9.00	NA	NA	NA	$17.50	$19.87	NA	NA	$17.00
Avg Sales Exp ¢/$ of CC EAR	NA	NA	15.3¢	NA	37¢	43¢	NA	16¢	NA	NA	NA	31.7¢	34¢	NA	NA	27¢
POLICIES																
Survey Customers	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Use Mailing List	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dem/Loaner Counter Equip	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dem/Loaner Heavy-Duty Equip	Yes	No	No	No	No	Yes	No	Yes	Yes	No	Yes	No	Part	No	Yes	Yes
Service Equip	Yes	No	Yes	Part	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Followup Dodge Rpts	Part	Yes	Yes	NA	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Kitchen Layout Serv	Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Incentives for Reps	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No
Wiring Subsidy ($/Kw)	$6 Avg.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Finance Wiring	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes
PROGRAM																
Annual Rep Training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dealer Cooperation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	No
See Cust Twice Yr	Part	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes
See Archts Quarterly	Yes	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Part	Yes	No
Direct Mail Quarterly	No	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Part	Yes	No	Yes
Free Trials— Counter Equip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Free Trials— Heavy-Duty Equip	Yes	No	No	No	No	Yes	No	No	No	No	Yes	No	Part	No	No	Yes
Prospect Meetings (min twice yr)	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	No
Spring/Fall Drives	Spr.	Spr.	Yes	Spr.	Both	Both	Spr.	Fall	Yes	Sum.	Yes	Fall	Spr.	Yes	No	Both
Dealer Incentives	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No
Use & Care Instruct	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mail "Food Service" to 30% of Cust	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Testimonial/Photo File	Yes	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
Display Equip/ Model Kitchen	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Part	Yes	Yes
RESULTS																
CC Kw Added—1955	5,354	4,850	3,273	3,119	1,053	624	11,124	6,300	11,540	10,913	3,281	1,691	2,311	2,651	2,189	640
CC Kw Added—1954	4,570	4,200	1,976	2,719	914	421	6,456	3,475	10,163	9,812	2,481	1,438	1,886	2,912	$1,314	592
1955 CC EAR ($1,000)	133.8	NA	81.7	56.7	22.8	15.0	NA	112.2	288.5	NA	NA	33.2	63.1	64.4	42.0	19.2
Est CC Kw Added— 1945–1955	15,420	30,000	17,600	25,000	3,402	4,600	NA	34,219	38,526	43,215	16,800	11,672	8,400	19,000	NA	2,261
RATINGS																
CC Kw Added per 14 Comm-Ind meters '55	2.34	2.32	2.32	2.21	2.18	2.14	2.13	2.09	2.09	2.09	2.03	2.0	1.92	1.9	1.9	1.86
Program Quotient	20.74	14.03	17.76	13.72	19.49	24.46	20.23	13.48	16.52	19.1	18.36	20.35	16.99	16.29	17.25	19.61
Index Number	97.9	144.1	113.7	139.9	97.3	76.2	91.4	134.8	79.2	95.4	96.2	85.5	98.5	101.6	95.9	82.3

. . . Use these charts to guide your own commercial cooking sales course

	Okla. G&E	Hart. E Lt.	Fla. Pwr.	Dal. P&L	Ngnst. Elec.	Nash. Elec.	N.J. P&L	Nthmp E. Lt.	Union Elec.	S. Cal. Ed.	Duq. Lt.	Jer. Cent.	Wey-mth	Ark. P&L	West Mass.	Ky. Util.	Ia. EL&P	E. Sh. PS	Quin Elec.
	16	29	10	6	10	16	25	5	29	25	17	2	10	3	5	20	4	7	10
	No	No	No	No	No	No	No	No	No	No	No	No	50	No	No	No	100	No	50
	35.0	13.6	30.7	17.9	21.0	12.3	9.8	1.1	49.3	135.3	55.0	27.6	1.3	27.6	14.6	29.0	19.5	9.5	3.0
	.60	.18	.88	2.5	1.4	.60	.55	.30	3.6	28.7	4.0	1.1	.15	2.2	1.5	1.0	5.0	.67	.28
	5.1	1.0	2.9	1.3	2.0	1.2	.50	.96	4.5	9.4	5.1	2.0	.10	3.5	1.0	NA	2.4	.57	.25
	2	1	2	1	2	1	No	No	2	9	1	No	No	1	No	No	1	1	No
	8/20	1/100 1/80 6/20	14/20	8/35	2/10	3/5	6/30	5/10	35/10	88/5	18/25	2/50	1/15	14/30	5/30	16/35	27/10	2/5	3/15
	1.01	2.89	1.52	1.85	.98	.89	1.72	4.11	1.04	.82	.93	.35	1.0	1.74	.93	2.2	1.5	1.08	1.37
	$50.0	NA	$29.0	NA	$15.0	NA	NA	$1.7	NA	$72.3	NA	$9.0	$1.0	NA	NA	$22.0	$8.0	$8.5	$1.5
	$9.80	NA	$10.00	NA	$7.50	NA	NA	$18.00	NA	$7.70	NA	$4.50	$6.00	NA	NA	$12.90	NA	$14.80	$6.00
	NA	NA	37c	NA	32.5c	NA	NA	6c	NA	15c	NA	28c	25c	NA	NA	33c	30c	23.5c	20c
	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes
	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Part	No	Yes
	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
	Yes	Part	No	Part	Yes	Yes	No	Yes	Part	Yes	No	No	No	No	Yes	No	Yes	No	No
	Yes	No	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	NA	Part	No	No
	Yes	Yes	Yes	Part	No	Part	Yes	Yes	Part	Yes	Yes	No	Yes	Yes	Part	Yes	Yes	Yes	Yes
	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No
	No	No	No	No	No	$5	No	No	No	No	No	No	No	No	No	No	$6	No	No
	No	No	No	No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes
	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No
	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes
	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes
	No	Yes	No	Part	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No
	Yes	Part	Yes	Both	Yes	No	No	Both	Spr.	No	Spr.	No	Yes	Spr.	Yes	Both	No	No	Both
	No	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	No	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Part	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
	Yes	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Part	No	Yes
	4,725	1,834	4,100	2,500	2,660	1,515	1,199	137	5,648	16,920	5,415	2,604	135	2,606	1,422	2,537	1,980	800	250
	2,789	1,533	3,629	1,200	1,784	1,004	1,002	115	4,599	6,900	6,499	2,171	216	1,563	1,906	1,703	1,200	550	100
	117.6	59.4	77.5	50.0	46.0	25.0	21.3	6.2	141.2	497.6	NA	32.3	4.0	74.2	35.5	76.9	29.7	20.0	7.5
	26,309	12,750	NA	7,000	15,000	NA	10,800	700	42,921	77,188	38,834	7,000	750	6,250	12,350	17,030	4,240	2,000	900
	1.85	1.85	1.81	1.69	1.65	1.62	1.6	1.57	1.48	1.44	1.27	1.27	1.26	1.22	1.22	1.18	1.13	1.09	1.06
	19.01	20.89	14.52	19.85	11.98	13.39	15.72	12.11	16.04	11.82	16.93	7.85	13.0	19.74	17.43	12.7	15.0	11.08	13.37
	84.5	77.1	108.4	74.1	119.6	105.2	88.4	112.9	80.4	105.9	65.1	141.1	84.0	53.7	61.0	80.8	65.6	85.8	68.8

I-T-E Secondary Unit Substations



. . . designed and built for economy in installation and operation

I-T-E Secondary Unit Substations bring electric power nearer to where you use it—make it more dependable—save you time and money.
They do it in several ways:

- By bringing higher voltages nearer the load and reducing power losses
- By reducing voltage drops inherent in long low-voltage runs and increasing machine efficiency
- By saving space—all necessary components are housed in one functionally designed unit
- By cutting delivery and installation time—units are assembled, tested and shipped ready for immediate installation from one source of supply
- By protecting plant personnel—all live parts are isolated and metal enclosed

I-T-E Secondary Unit Substations can be supplied for any application indoor or outdoor, and in any standard rating. For complete information, contact your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

I-T-E

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

Commercial Cooking: What Utilities Do to Sell It (continued)

ORGANIZATION	Cin. G&E	Miss. P&L	Inds. P&L	Ala. Pwr.	Emp. Dis E.	Sav. E&P	Det. Ed.	L.A. W&P	S.W. G&E	Cons. Pwr.	Niag-Mo.*	Cen. P&L	La. P&L	Ida. Pwr.	Mont. Pwr.	Vep-co
Yrs CC Promoted	6	4	8	3	5	5	9	26	3	2	....	1 1/2	3	27	36	....
Merchandises CC (% territory)	Part	No	No	No	100	100	No	No	No	20	No	No	No	No	No	No
Comm Meters (1,000)	42.8	21.1	25.5	55.5	8.5	6.5	107.9	122.0	23.7	90.0	44.0	38.5	19.0	18.0	17.0	75.0
Ind Meters (1,000)	1.3	3.0	1.1	1.8	.65	.12	.65	8.9	4.1	3.2	1.4	2.1	2.4	.75	2.3	.57
Food Serv Cust (1,000)	4.0	.8	1.7	5.5	.50	.20	9.3	5.0	2.0	9.0	5.0	1.0	1.2	.45	2.1	3.5
Has CC Specialists	1	No	2	1	2/5%	No	No	6	1	1	No	1	No	4	2	No
No. All-Purp. Reps /% Time on CC	17/3	18/10	None	30/9	8/5	2/20	82/5	30/3	6/30	5/30	20/10	1/10	30/3	NA	15/10	55/10
Man-Years per 10,000 Comm-Ind Cust	.34	.74	.75	.64	.54	.60	.38	.53	1.0	.29	.44	.27	.42	8.30	1.81	.73
BUDGET																
Sales Exp ($1,000)	$10.0	NA	NA	NA	NA	$4.0	NA	$44.6	$20.4	NA	$1.5	$20.0	NA	NA	NA	NA
Sales Exp/Cust—($)	$2.50	NA	NA	NA	NA	$20.00	NA	$8.92	$10.22	NA	$3.00	NA	NA	NA	NA	NA
Avg Sales Exp ¢/$ of CC EAR	9¢	NA	NA	NA	NA	15¢	NA	46¢	55¢	33¢	5¢	30¢	NA	NA	NA	NA
POLICIES																
Survey Customers	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	No	Yes
Use Mailing List	No	Yes	Yes	Part	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA
Dem/Loaner Counter Equip	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
Dem/Loaner Heavy-Duty Equip	No	Part	No	No	Yes	Part	Part	Part	Yes	Yes	Part	No	No	Yes	No	No
Service Equip	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	No
Followup Dodge Rpts.	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No
Kitchen Layout Serv	No	Yes	Yes	No	Yes	Yes	No	Part	No	Yes	No	Part	No	Yes	Yes	No
Incentives for Reps	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No
Wiring Subsidy ($/Kw)	No	No	$5	No	$1.60**	No	No	$4	No	No	No	No	No	No	No	No
Finance Wiring	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
PROGRAM																
Annual Rep Training	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes
Dealer Cooperation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
See Cust Twice Yr	No	Yes	Yes	No	Yes	No	Yes	Part	Yes	No	No	Yes	Yes	Yes	Yes	No
See Archts Quarterly	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Direct Mail Quarterly	Part	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Free Trials— Counter Equip	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
Free Trials— Heavy-Duty Equip	No	Part	Part	No	Yes	No	Part	No	Yes	Yes	Part	No	No	Yes	No	No
Prospect Meetings (min twice yr)	No	Yrly.	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yrly.
Spring/Fall Drives	No	Both	No	Spr.	Yes	No	Yes	No	No	Both	No	No	Yes	Yes	No	Fall
Dealer Incentives	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No
Use & Care Instruct	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes
Mail "Food Service" to 30% of Cust	No	Yes	No	Yes	No	Yes	Yes	Part	Yes	Yes	Part	Yes	No	Yes	Yes	Yes
Testimonial/Photo File	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes
Display Equip/ Model Kitchen	No	Yes	No	No	Yes	No	No	Yes	No	Yes	Part	No	No	No	Yes	Yes
RESULTS																
CC Kw Added—1955	3,127	1,600	1,666	3,534	512	350	5,129	6,027	1,069	3,472	$1,505	1,100	500	NA	NA	NA
CC Kw Added—1954	2,704	1,722	1,762	2,729	526	967	4,174	5,250	1,073	2,027	993	500	450	NA	NA	NA
1955 CC EAR ($1,000)	93.7	NA	46.2	59.9	28.0	7.0	NA	96.4	37.4	74.2	30.0	55.0	12.5	NA	NA	NA
Est CC Kw Added— 1945–1955	14,276	NA	10,000	NA	1,038	2,260	42,650	NA	3,084	9,091	5,000	NA	1,500	NA	NA	NA
RATINGS																
CC Kw Added per 14 Comm-Ind meters '55	.99	.92	.87	.85	.78	.73	.66	.64	.53	.52	.46	.36	.32	NA	NA	NA
Program Quotient	7.84	19.24	15.25	13.14	17.54	13.1	17.38	15.53	13.5	16.29	7.44	15.77	11.92	25.3	11.8	11.73
Index Number	110.2	41.6	49.7	56.3	38.6	48.3	33.0	35.8	34.2	27.8	53.5	19.9	23.4	NA	NA	NA

* Western Division ** Above 16Kw

Top Spokesmen Hotly Debate "Preference"

• Vennard, Priest, Hill blast federal power marketing clause as discriminatory and foreign to free enterprise; ask that all customers be given an even break in purchasing power

• Olds, Norwood, Potamkin argue that preference assures public bodies and cooperatives a fair share of federal power

Participants in Montana State University's first annual water resources conference got their money's worth: A lively two-day debate on the controversial "preference clause" by six of the nation's ablest spokesmen on the subject.

It was a no-winner contest, but every participant was exposed to one of the most detailed, thorough, and provocative arguments ever presented on the legislative language giving public bodies and cooperatives priority in the purchase of federally produced power. In a variety of forms, the "preference clause" appears in federal legislation relating to federal power development.

Strongly condemning "preference" were Edwin Vennard, Edison Electric Institute; A. J. G. Priest, law professor, University of Virginia; and Francis P. Hill, utility attorney with the firm of Gray, Hill & Rogers.

Vigorously endorsing "preference" were Leland Olds, former chairman, Federal Power Commission; Lawrence Potamkin, secretary of the National Rural Electric Cooperative Association's lawyers' committee; and Gus Norwood, executive secretary, Northwest Public Power Association.

Main points of the "preference" opponents:

- "Preference" means special privilege and is unfair.
- It has been used to foster the growth of public power at the expense of electric companies and their customers.
- It enables public power customers to escape part of their tax burden.
- A fully informed public is opposed to the "preference clause."
- The "preference clause" is foreign to the free enterprise system and breeds a philisophy which would restrict individual freedom.

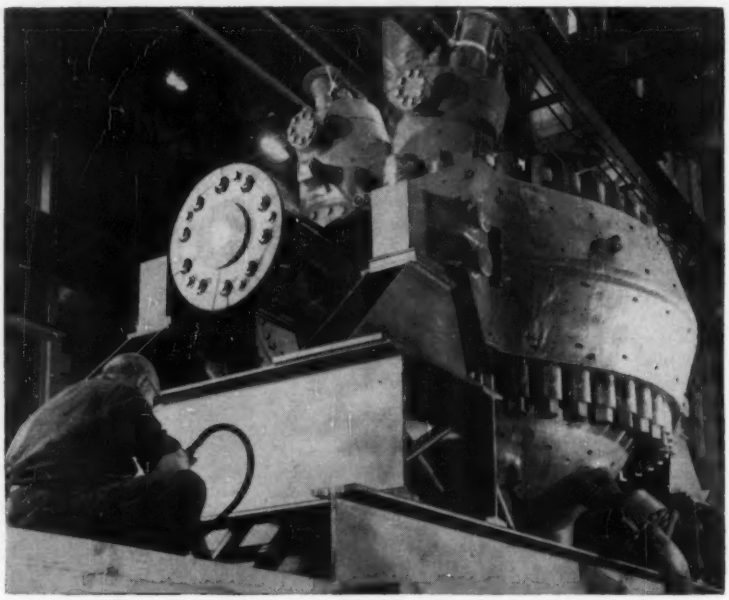
Vennard argued that the existing federal power marketing legislation should be amended to give all farm, residential, and small commercial customers a fair share of the power produced in their area regardless of the form of their supplier. He lauded the conference as a means of informing people of the true nature of "preference."

Main points of the "preference" advocates:

- "Preference" gives public bodies and cooperatives a better chance of securing a fair share of federally-produced power.
- It discourages monopoly of federal power markets.
- It helps in assuring power at the lowest possible rates.
- It has fostered the growth of electric cooperatives and strengthened local units of government.
- Other federal legislation has given special attention to selected groups in other matters.

Norwood called for stronger preference clauses in federal power marketing legislation. He would like the federal government to have full authority to build transmission lines and other facilities to assure rigid enforcement of "preference." He would also require that all transmission lines across federal lands be designated "common carriers" and used if needed to implement "preference clauses."

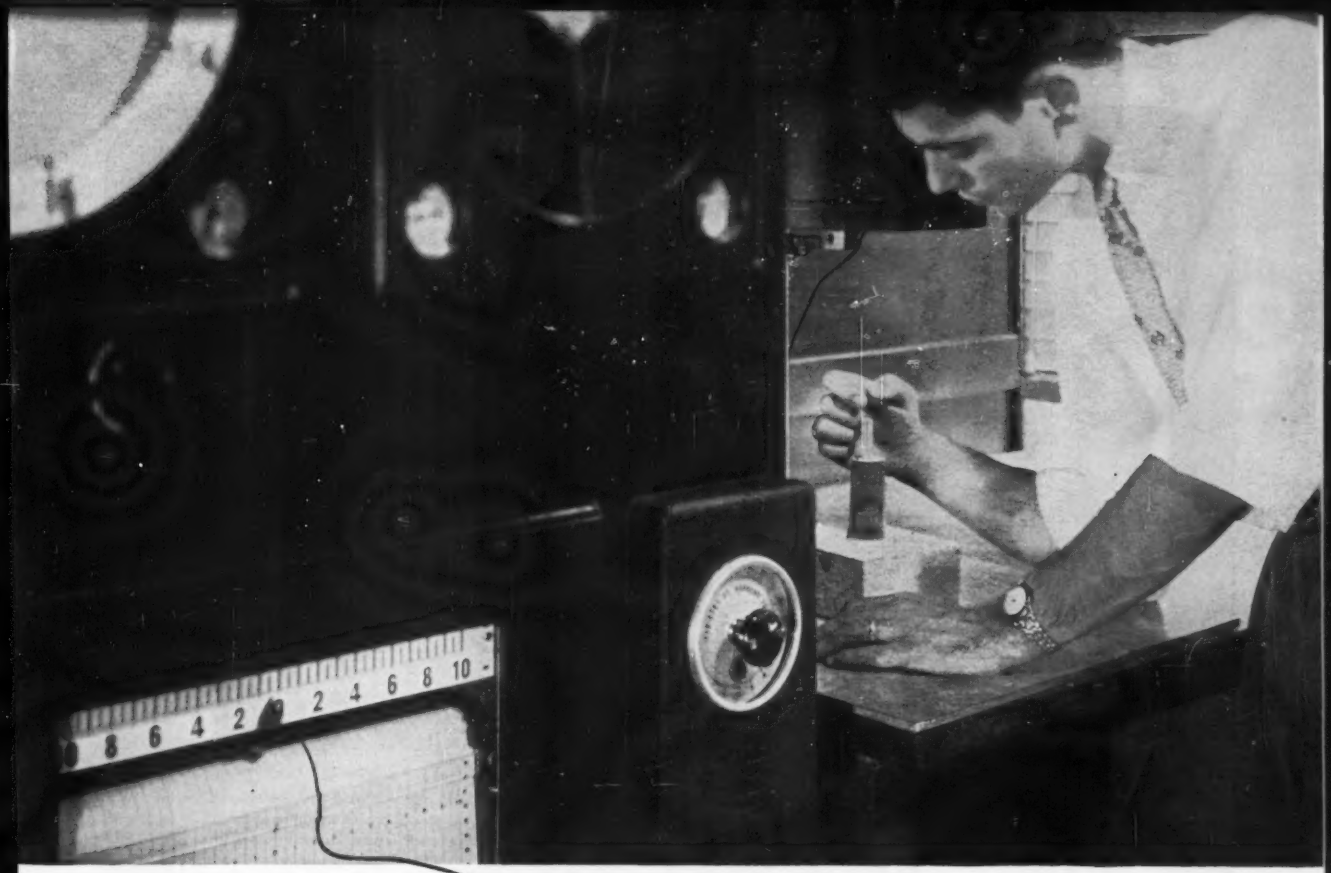
Full transcript of debate will be available from Albert W. Stone, Professor of Law, Montana State University, Missoula, Mont. Price: about $2.50.



Ohio Power to Install 4,500-Psi Unit

The world's first commercial supercritical pressure steam turbine-generator unit, a portion of which is shown above, is due for installation this year at Ohio Power Co's Philo station on the American Gas & Electric Service System near Zanesville, Ohio. Photo shows the steam turbine casing enclosing the supercritical pressure section.

The 125,000-kw turbine, manufactured by General Electric Co, will operate using steam at the initial pressure of 4,500 psi at the initial temperature of 1,150F. Highest known steam pressure used by steam turbines now in commercial service is 2,400 psi.



Keeping track of

$5Al_2O_3.2MgO.24SiO_2.6H_2O.Na_2O.CaO$

...in Insulator Raw Materials

The complex formula above stands for "Montmorillonite", one of a group of highly plastic minerals present in the clay which is a component of every insulator. As these little known minerals contribute properties to the clay which are most important when it is formed into insulators for your power system, it is necessary to determine their presence and quantity in raw materials coming to us from the mines.

In the past, it has been difficult to make fast, positive identification of these fine clay fractions . . . even by such means as the petrographic microscope and X-ray diffraction.

Today, however, General Electric is pioneering the application of Differential Thermal Analysis (DTA) in this small but important phase of Locke* insulator manufacture. DTA is a reliable system for determining minerals in ceramic materials by interpreting differences in heat absorption and emission during firing between a test sample and a known inert material. These are recorded by the graph you can see in the photo. With DTA, another scientific method is added to mass production of fine electrical porcelain.

DTA is another illustration of the extremes to which we go to make sure you get Locke insulators of uniform density, high mechanical strength, dimensional accuracy and long service life. Insulator Department, General Electric Company, Baltimore, Maryland.

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Progress Is Our Most Important Product

GENERAL ELECTRIC

Why you should use G&W POTHEADS

on rubber insulated, shielded, neoprene jacketed 15 Kv. cables

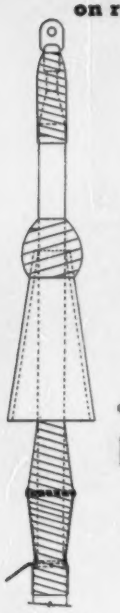


Fig. 1—
Cable termination.

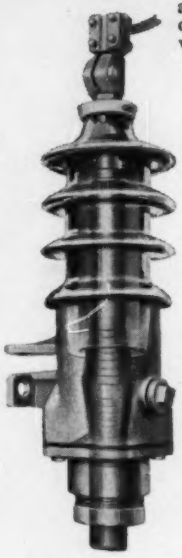


Fig. 2—
15 Kv. Pothead

Increasing the creepage length on a cable in air beyond a certain distance increases the flashover very little—because ionization of the air (corona) begins at the grounded shielding terminus at the same potential (for a given cable) regardless of the length.

Equipotential lines—
A—B—C—D

Flux lines—
X—Y—Z

Fig. 4—Without stress relief cone. High electrical stresses at grounded shielding may cause insulation failure.

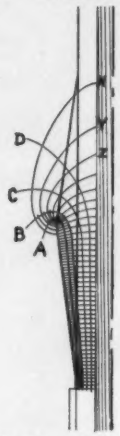


Fig. 5—Stress relief cone decreases radial electrical stresses in the cable insulation but has little influence on longitudinal stresses.

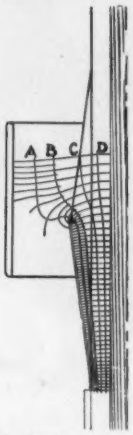


Fig. 6—Further decrease in concentration of flux lines and increase in electrical strength is provided by proper location of grounded pothead body.

A. Exposed insulation surfaces become coated with contaminating dust and in coastal zones salt condensation – which become conducting when wet. As the conducting surface dries unevenly, excessive voltage gradients develop over small areas – arcing can occur and carbonize the organic insulation of a cable termination and result in dielectric breakdown. Inorganic porcelain as used in a pothead is not so affected.

B. The principal benefit of the stress relief cone is in the improved strength of the installation due to an increased resistance to puncture of cable insulation at the grounded shielding terminus where the stress is greatest.

C. Cable surface flashover is increased by the use of insulating compound which has a high dielectric strength compared to air. A pothead provides a container for compound and the compound permits a considerable reduction in the length of the installation.

D. The pothead porcelain provides an outer surface of relatively large diameter compared with the cable, thus reducing the external voltage stresses.

E. High external creepage distance for a given length of porcelain is provided by petticoats which improve the wet flashover characteristics.

F. Potheads (porcelain insulated, compound filled, hermetically sealed) properly protect cable ends against the contaminating effects of weather. G&W potheads meet established A. I. E. E. standards of 60 cycle and impulse voltage withstand values. The extra cost of a pothead (fig. 2) over the cost of materials required for a cable termination (fig. 1) is relatively small – compared with direct and intangible losses resulting from service interruptions due to failures of improperly protected cable ends.

Send for Bul. A56 on CABLE TERMINATING

G&W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois, U.S.A.
Representatives in principal cities of U.S.A.
Canadian Mfr. — Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

Send for Bul. AB-D—Pothead Installation Instructions.

A561

EEI's Round Table on Labor to Attack Tomorrow's Problems

"Preparing Today for Tomorrow's Problems" is the theme of the Ninth Annual Round Table Conference of Edison Electric Institute's Industrial Relations Committee. The meeting will be held at the Drake Hotel, Chicago, Ill., on Sept. 17-19.

Four of the top electric utility industrial relations executives and their topics are:

- "Preparing Today's Employee for Tomorrow's Problems," H. L. Bowen, manager of employee relations, Georgia Power Co.
- "Preparing Today's Supervisor for Tomorrow's Problems," S. F. Leahy, manager of employee relations, The Detroit Edison Co.
- "Preparing Today's Labor Organization for Tomorrow's Problems," E. J. Thimme, industrial relations manager, Public Service Electric & Gas Co.
- "Preparing Today's Industrial Relations Department for Tomorrow's Problems," F. L. Larkin, vice president, Wisconsin Electric Power Co.

Bowen, speaking on tomorrow's problems for employees, will tell the conference that the highly skilled employees who make up our organizations in the future will have an infinitely greater going concern value than they do at present. A new concept may arise, he will point out, under which we will treat labor as a capital investment with wages considered virtually as fixed charges.

Mass production, the Georgia Power executive will say, upgraded the underskilled laborer of yesterday into the semiskilled machine operator of today. Automation will upgrade semiskilled machine operator of today into a highly educated technician. It will lead, he states, to the human use of human beings, that is, to the greater use of man's specifically human qualities—his ability to think, to analyze, to decide.

Leahy will tell the conference that recent studies of organizational effectiveness add convincing evidence of the vital role occupied by the supervisor. His leadership characteristics and the way in which he works with his people, he says, have maximum influence on their motivation and achievement. He will ask the electric utility industry the question "Are your supervisors prepared to carry out this important responsibility?"

"The basic problem confronting us, if our industry is to survive as a private industry," says Thimme, "is to help the labor organization to appreciate management's goals and problems and to aid, rather than obstruct, in attaining these goals. There must be a constant reminder to the unions through education that both sides must get along together through utilization of and compliance with collective bargaining agreements."

The industrial relations department of an electric utility must not only report directly to top management, Larkin will tell the meeting, but it must have unqualified support in all proper undertakings. This department, he will continue, must improve its services to the operating departments or risk having its functions swallowed up by other departments.

After these four keynoters deliver their talks on Monday morning, conferees will divide into groups to continue more detailed discussions of the topics. Round table conferences will be held on Monday and Tuesday afternoons and on Tuesday and Wednesday mornings.

For further information on the coming conference, write E. S. Evans, secretary, Industrial Relations Committee, Edison Electric Institute, 420 Lexington Ave., New York 17.

H. L. BOWEN

S. F. LEAHY

E. J. THIMME

F. L. LARKIN

Steel Prices—The Big Study Is Underway

Electrical manufacturers say increased steel costs are being examined but no major price adjustments are forthcoming—yet. Inventories are in good shape for most firms, some delays expected in meeting '56 orders

Higher costs of steel, plus more expensive materials and increased wages, are leading to adjustments in electrical manufacturers' prices. Just what the adjustments may amount to hinges on studies companies are currently making. And it's obvious any adjustments will not be downward.

This was the gist of an EW survey last week which also revealed that inventories would see most firms through the steel industry's climb to full production capacity. Some scattered delivery delays are expected.

At General Electric Co, officials haven't planned specifically any price increases. But the officials feel that "GE cannot absorb increases of this kind," a spokesman said. They will have to pass on the added costs sooner or later, he predicted. Major appliances will definitely go up but the percentage increase won't be decided until studies are completed.

2 Steam Turbines Set Back

Generally, there has been no delay in deliveries. A couple of steam turbines scheduled for late-1956 delivery have been set back 30 to 45 days, though. The inventory situation is generally good across the board, the spokesman said. Several GE plants adjusted vacation shutdowns to coincide with the steel strike, which helped keep backlog in good shape. Shortages of structural steel may delay the opening of GE's new plant at Louisville appliance park.

During Westinghouse Electric Co's own strike, the company continued to purchase steel in preparation for a higher operating rate. "As a result," said a spokesman, "our inventory was much higher than normal at the beginning of the steel strike." He added that a steel strike of three or four months might have caused quite a different picture.

Tightness of steel plate, even before the steel dispute, has aggravated the availability of this particular form of steel, the spokesman said. As for prices: "Studies are in progress now to determine what adjustments, if any, need be made," he declared. Westinghouse does not expect any widespread delays in deliveries.

A-C Notes Cost Increase

The major effect of the steel strike throughout Allis-Chalmers Manufacturing Co operations has been "substantial increases in costs," a company official stated. "Even before the strike, shortages in some types of steel, particularly in heavy plate, resulted in high premium prices. The increased base mill prices following the strike, with the continuing high premium prices, make the increases in costs of our products even more critical," he said.

In examining the impact of steel price increases, A-C said, "As we are able to, we'll adjust our price schedules to conform to our increases in costs."

Deliveries of orders for some sizes and forms placed with steel mills appear to be delayed from 45 to 90 days. A-C hopes to offset this by using conversion and warehouse steel until re-establishing procurement through normal channels. Production delays have nonetheless occurred on items using, for example, heavy forgings, which can only be remedied by resumption of suppliers' production, the spokesman concluded.

Effects on I-T-E "Insignificant"

Effects of the strike were called "insignificant" for I-T-E Circuit Breaker Co, said Harry L. Buck, vice president and general manager. "We came through it very well," he declared. Inventories are in good shape. In regard to prices, steel costs are just one of many factors to be evaluated in pricing products, Buck said. (I-T-E is currently negotiating with union leaders on a contract which expires at month's end. Buck said the union is asking 15¢ an hour, an increase "more realistic this year than it's been in the past." He said the company's offer was now under study but didn't add whether the settlement, when it is reached, would bring a price adjustment on I-T-E products.)

In low-voltage distribution equipment at least two companies—Square D and Federal Pacific Electric—have announced an 8% price increase. Spokesmen of both firms said the steel price rise was only one of several causes contributing to the additional cost.

Plant Expansions Slowed

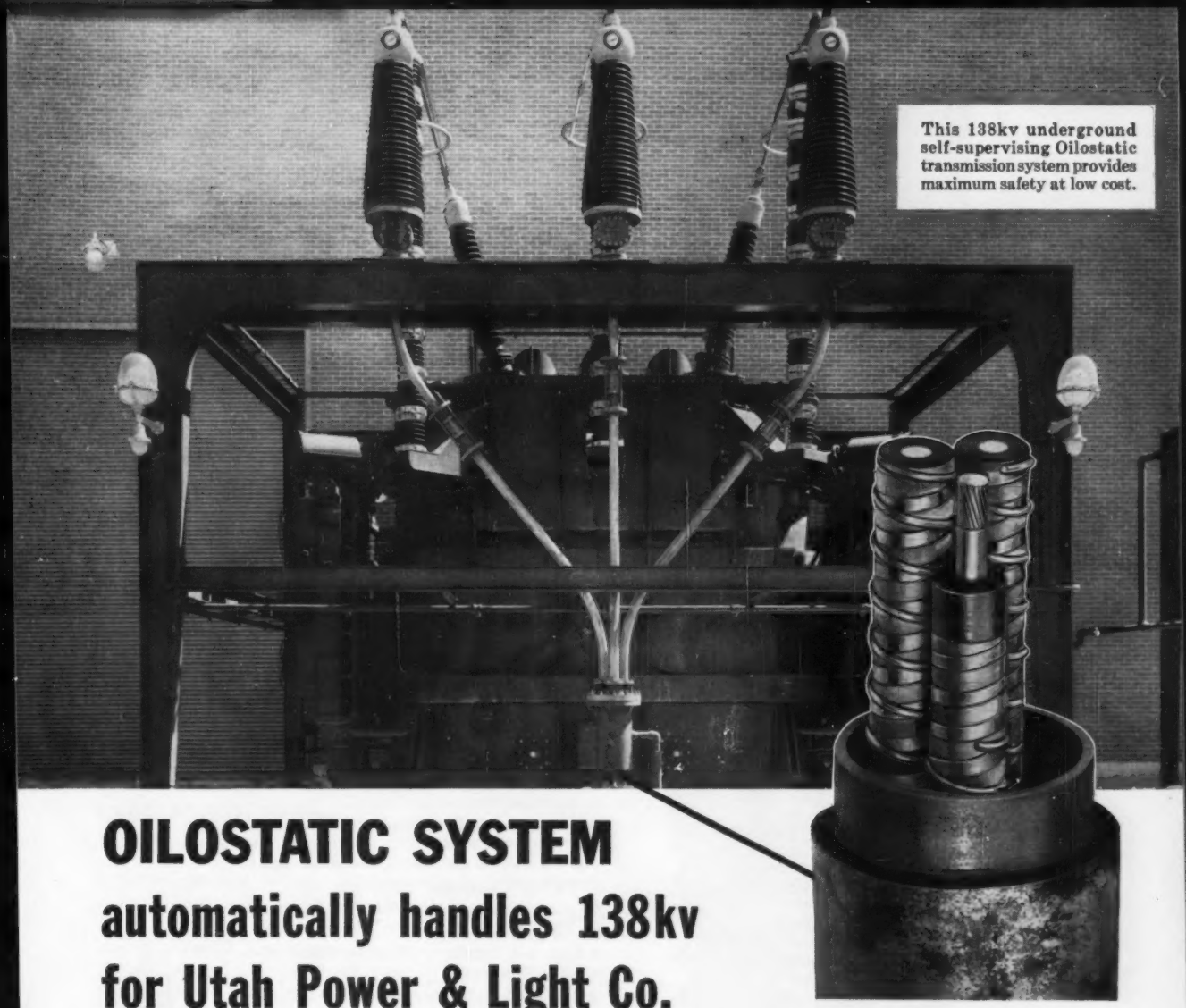
Square D will feel the steel shortage most at five plant expansions now underway. These will be set back two to three months, according to a company official. There'll be no production delays, he said, even though the firm is running 38% ahead of last year's capacity. Square D, in anticipation of both the strike and increased steel costs, built up a comfortable inventory which will carry them over any steel delivery delays, the spokesman said.

Federal Pacific Electric's official termed their inventory situation as "normal for this time of year." They expect a 5 to 10% over-all price hike by the industry, their spokesman estimated, and FPE "will probably ride with the pattern set by bigger companies."

Moloney Electric Co's vice president of sales, E. C. Mulcahy, said the steel walkout had little or no effect on operations, inventory was satisfactory, and no production or delivery difficulties had been encountered. As for price adjustments, they were "undetermined," presumably until the completion of studies and any announcements to be made by the other firms.

No price adjustments have occured at Delta Star Electric Division of H. K. Porter Co, Inc. "Delta may pass

(*Continued on page* 59)



This 138kv underground self-supervising Oilostatic transmission system provides maximum safety at low cost.

OILOSTATIC SYSTEM automatically handles 138kv for Utah Power & Light Co.

Recently the **Utah Power & Light Co.** started operation of the third section of its new Gadsby steam-electric station to supply the growing power demands of the Intermountain West.

For the all-important high voltage transformer leads, an underground Okonite Oilostatic system was selected and installed by the **Bechtel Corporation.**

This system consists of paper-insulated cables installed in a welded steel pipe filled with oil maintained at 200 psi. The advantages of this type system are:

1. *Proved reliability, ruggedness and stability.*
2. *High normal and overload current carrying capacity.*
3. *Low initial cost compared to duct systems, plus space savings.*
4. *Low maintenance cost through self-supervision.*
5. *Ideal for high voltage transmission in congested areas.*
6. *Provides maximum safety.*

Proof that **Utah Power & Light** can expect to get outstanding performance from this installation is the fact that Okonite Oilostatic systems have been in successful operation since 1932.

For information on Oilostatic which has been installed to handle potentials as high as 230kv, write for Bulletin EW-1044. Address:
The Okonite Company, Passaic, New Jersey.

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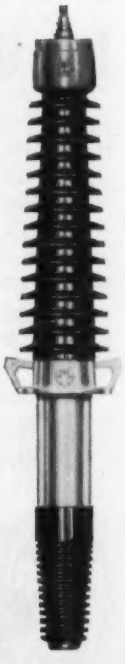
available with either copper or aluminum conductors

OKONITE insulated cables

SMALL DIAMETER

What does it mean in new O-B Bushings?

- Meets ASA Standards in the range now approved. At ratings not yet included in the standard, the same basic design principles prevail.
- Available for all voltages from 15 to 230 kv.
- Fits all modern transformers and circuit breakers.
- Reduced diameter facilitates application to older station equipment for replacement purposes during modernization.
- At every voltage rating, full condenser construction is employed for the insulating core.
- Backed by 45 years of extensive production, outstanding success, and fine reputation in the bushing field.
- The only bushing on the market manufactured by independent insulation specialists.



Ohio Brass

MANSFIELD OHIO, U.S.A.

4644-H

The Big Study

(*Continued from page* 56)

along any increased costs" though, a New York spokesman of the parent company said, after studies have been completed.

Increased costs of 7½ to 10% for pole line hardware were announced about a month ahead of the steel rise. Hubbard & Co, Line Material Co, and A. B. Chance Co were the principals. A Chance Co official said his company is reviewing prices on other lines. Their inventory is generally satisfactory, but shortages in specific sizes have caused some delays in deliveries which "should be back on schedule by early September," he added.

Other companies who have already announced price boosts include Gar Wood Industries, Inc, who increased truck bodies, hoists, winches, elevating end gates and truck platforms by 10%; Crane Co set an across-the-board hike of 7½% on pipe; and National Electric Products Co upped electric distribution equipment 5 to 7.7%.

Cable Makers Report Net Income Advances

Cable industry leaders reported marked increases in estimated net incomes for the first half of 1956 over the same period a year ago. Phelps Dodge Corp set new records with net income after taxes and depletion charges of $51,124,617, or $5.04 a share, compared with $32,672,177, or $3.22 a share, in the 1955 period.

Anaconda Co nearly doubled profits in the first half. Net income was $61,334,128, or $7.07 a share, *vs* $31,104,259, or $3.59 a share last year.

General Cable Co scored $5,491,047 profits for the 1956 period. This amounted to $1.93 a share compared with net income in 1955 of $2,950,114, or $1.27 a share.

Okonite Co announced a $982,747 net income, or $5.09 a share, in the period ending June 30. This compares with $672,331, or $3.72 a share, for a year ago.

Rome Cable Corp's quarterly report, as of June 30, listed a net income of $540,000 for three months, equal to $1.02 a share, compared with $380,000, or $0.74 a share in the same quarter last year.

M&M BRIEFS

Federal Pacific Electric Co has declared a 20¢ quarterly dividend payable Sept. 17. Formerly, 15¢ was paid.

I-T-E Circuit Breaker Co has announced a 31¼¢ dividend payable Sept. 1, compared with 25¢ in June and 20¢ in March and December.

General Electric Co will supply three 12,500-kw steam turbine-generators for Aluminum Corp of America's $45-million alumina plant at Point Comfort, Tex.

Bentley, Harris Mfg Co has received Underwriters' Laboratory acceptance for its BH Vinyl-Sil 105 sleeving for 105 C temperatures. The glass-fiber sleevings find application where insulation is bent over sharp edges.

Jeffries Transformer Co's new address is 610 Turner St, Los Angeles 12, Calif.

Kennecott Copper Corp started an advertising campaign last fortnight in national publications on theme "No Substitute Can Do What Copper Does."

Colorado Fuel & Iron Corp has moved its Philadelphia district warehouse and sales office to new, larger quarters at 225 W. Erie Ave.

McGraw Electric Co has completed negotiations to acquire Speed Queen Corp, subject to approval by stockholders of the Ripon, Wis., maker of washers, dryers and commercial laundry equipment. Speed Queen sales in 1955 were about $25 million. McGraw Electric totaled $143,822,000 in sales last year, expects to hit over $200 million in 1956.

Union Bag & Paper Corp, with corporate headquarters in Jersey City, N. J., has acquired control of American Creosoting Co. The purchase includes American Creosoting's 21 U. S. plants and 38,000 acres of timberland in Georgia near Union's Savannah mill.

Yale University's news bureau has announced a one-day symposium on occupational noise. Sept. 17 meeting will be held at Yale-New Haven Medical Center to cover varied problems from physiological to economic.

American Brass Co, 25 Broadway, New York, 4, N. Y., has made first shipments of flexible metal hose and tubing from the firm's $2.5-million Mattoon, Ill., plant. The one-story factory has 86,000-sq ft of floor space on a 55-acre site.

American Machine & Foundry Co's Leland Electric Co Division has increased fractional horsepower motor prices 7½%.

Ekco Products Co of Chicago has purchased Ruby Lighting Co, makers of industrial and commercial fluorescent fixtures. Ruby's Los Angeles operations will move to Ekco's Whittier factory while production at Dallas will remain unchanged.

MANUFACTURERS' EARNINGS

COMPANY	PERIOD MONTHS	ENDED	NET INCOME 1956	NET INCOME 1955	EARNINGS PER COMMON SHARE 1956	EARNINGS PER COMMON SHARE 1955
Allis Chalmers	6	June 30	$11,855,714	$12,562,932	$1.44(a)	$1.54(a)
American Chain & Cable	6	June 30	3,870,820	2,765,767	3.66	2.61
Baldwin-Lima-Hamilton	6	June 30	1,580,550	1,007,033	0.36	0.23
Babcock & Wilcox	6	June 30	7,199,769	7,231,708	1.40	1.41(b)
Blaw Knox	6	June 30	3,557,972	968,740	2.27	0.62
Combustion Engineering	6	June 30	3,630,483	2,933,321	1.14	0.92(b)
Elliott Co	6	June 30	891,145	193,358	1.40	0.09
Foster Wheeler	6	June 30	484,113	899,249	0.82	1.53
General Electric	6	June 30	112,919,000	107,847,000	1.30	1.24
I-T-E Circuit Breaker	6	June 30	2,266,176	293,292	2.09	0.17
Kuhlman Electric	6	June 30	283,673	308,311	1.06	1.15(b)
McGraw Electric	6	June 30	7,338,000	4,803,000	3.45(a)	2.28(a)
Sangamo Electric	6	June 30	1,537,540	1,254,541	1.92	1.57
Victor Equipment	6	June 30	314,093	206,299	1.32	0.87
Wagner Electric	6	June 30	2,870,015	2,343,113	3.04	2.48

Note—(a) On shares outstanding at close of the period. (b) Based on shares now outstanding.

BUSINESS OUTLOOK

Electrical World
AUGUST 27, 1956

Economically speaking we've been doing right well, and the prospects are we'll continue to do so.

The Department of Commerce last week gave out with the happy news that **GNP for the second quarter was the highest to date—$408.3 billion.** That means that the economy turned out more goods and services in the second three months of 1956 than in any other three-month period of our history.

• • •

The amazing thing about this showing is that it was made in the face of softness in two supposedly very important parts of the economy—autos and housing. (Autos last year were produced to the tune of 4.3 million in the first six months; this year the figure was only 3.2 million. And housing starts last year were 695,000 in the first six months; this year the figure was only 570,000.) The economy has proved conclusively it can slow down in two important sectors and yet be strong over-all—and it looks as though it intends to stay strong.

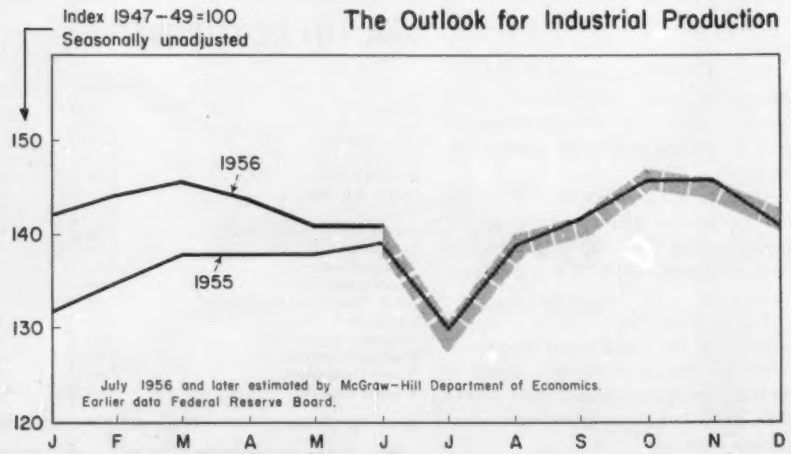
However, because of steel shutdowns and living on inventories, there is some chance that the figure for GNP for the summer months—that is, for the third quarter—will not quite equal the record set in the second. The Federal Reserve Board has also announced what might have been chilling news—industrial production was down from 141 in June to 136 in July. But that was to be expected merely on the basis of almost complete stoppage of steel production by the month-long strike.

A restraining note for the future is the tight money situation. Money has been getting harder and harder to come by. And the Fed seems set on making the market even tighter. This lack of money may well put a crimp on plenty of projects as government and industrial units balk at the highest money rates in almost 25 years. High-grade utility issues are now in the 4% range for the first time since the early 1930's.

• • •

But thanks to both price increases and some real increases in the production of goods and services, as business booms to make up strike-fed shortages, the final quarter GNP may approach the $415 billion mark. High personal income bolstered by lots of employment at higher wages is going to give sales a boost—an even bigger boost than they have been getting.

The Outlook for Industrial Production



Paul Bunyan-size reels save setups and splicing . . .

reduce shipping and stringing costs

No midgets are these reels. Largest ever used for aluminum transmission conductors in the United States, they are 96 in. diameter, 60 in. wide. Each reel contains 7,400 ft of 1.75 in. Alcoa® Expanded ACSR, weighs over 9 tons. Other "big" items on this order: cable diameter, 1.75 in., and line voltage, 330 kv—both new highs for the U. S.

Paul Bunyan-size reels mean long lengths without splicing or extra setups. Handling costs are reduced. Big reels will save you money on your next large-diameter conductor order.

This customer service is another "first" in Alcoa's tally of assists in economical solutions of conductor problems. Alcoa engineers are at your service.

Aluminum Company of America, 2306-A Alcoa Building, Pittsburgh 19, Pa.

THE ALCOA HOUR—Television's Finest Live Drama
Alternate Sunday Evenings

This shipment set records:
cable voltage—330 kv,
cable diameter—1.75 in.,
reel size—8 ft diameter, 5 ft wide,
ALL NEW TOPS FOR THE U. S.

IN THE INDUSTRY

Highway Lighting: Opportunity or Headache?

The vast new $33-billion federal road construction program poses several problems and opportunities for electric utilities. One big headache will be the extensive relocation of utility facilities caused by the network of interstate roads. The potential use of fly ash in this construction, on the other hand, clearly offers opportunity of vast proportions. Whether the lighting of crucial stretches of this vast highway system turns out to be a boon or a bane depends on how utilities tackle the matter.

Utility Support for Lighting Needed

Recent studies made by utility and other road lighting experts present convincing evidence that adequate highway lighting reduces night traffic accidents. A paper presented before the American Roadbuilders' Association indicates that some 12,000 of the 20,000 deaths caused by night traffic accidents in 1954 might have been prevented by proper highway lighting. Economic losses resulting from these preventable accidents run to $1.2 billion a year.

Because electric utilities are in a strategic position to understand and evaluate all aspects of highway lighting, they can make a substantial contribution to the further use of such lighting. A number of utilities have already accumulated useful data that is applicable. Almost all can furnish cost information on highway lighting installations. As a public service, utilities should furnish such information to state highway authorities in an effort to promote traffic safety. The sound public relations value of promoting highway lighting is obvious.

Once highway lighting is sold, utilities must then be prepared to serve the load. Several utilities which have faced the task solved it by selling metered energy, leaving installation and maintenance of the lighting fixtures to state or other public bodies. Other utilities have undertaken to maintain fixtures as well as furnish the energy. It may be that still other utilities will want to handle these highway installations on the same basis as regular urban street lighting.

Highway Lighting Must Be Planned Now

But no matter what the approach is to be, it is necessary that utilities give thoughtful consideration to their responsibilities in the field and be prepared to supply needs as they arise. As highway lighting must be an integral part of the road system, arrangements for it must be made during the initial stages of planning. For the tremendous federal program, this planning will come during the next two or three years.

Utilities should begin work now on policies covering the promotion and service of highway lighting. Wise and thoughtful policies on these two phases of the problem will help make highway lighting a welcome opportunity for the utility as well as a vital safety aid to the motoring public.

TECHNICAL NOTES

Sodium-graphite reactors promise 1,200F coolant from slightly enriched uranium or Th-U235 to create steam of pressure and temperature suitable for economical use in turbine generators.

Feedwater heater shells welded in place are practical in generating stations because they rarely require removal.

Impulse tests can boost core loss up to 2% if they induce enough voltage between transformer laminations to puncture insulating coating.

Tunneling powerhouse into solid rock costs more than above-ground construction. But substituting a rock tunnel for the highest-pressure portion of its penstock can make underground construction economical for a high-head hydroelectric plant.

Evaluating the cost of outages is the only way to justify adding buses, switches, and circuit breakers for flexibility in an otherwise adequate substation.

Fire insurance rates are lower for outdoor power stations than for semi-outdoor or indoor.

Dc transmission at about 400 kv on the Swedish EHV system would boost capability as much as would 650 kv ac with series capacitors.

Artificial lighting around turbine generators with desirable intensity levels is more difficult for outdoor installations than in a turbine room.

Major leakage channels in foundation rock are sealed with subterranean dams when they interfere with a reservoir for hydroelectric generation.

Housepower Campaigns at Conventions

The story of Housepower and modern living with electrical appliances was told to millions of Americans during the past two weeks along with news broadcasts of the Democratic and Republican National Conventions. Broadcasts, sponsored by Westinghouse Electric Corp and seen over 168 stations of Columbia Broadcasting System, covered numerous phases of the electrical story, from fry pans to industrial production.

As an added feature this year, representatives of local power companies appeared on 153 stations during the preconvention broadcasts. These speakers explained Housepower and gave it the local touch that added greatly to its appeal. On 12 stations this portion of the program was handled by Donald S. Kennedy, president of Edison Electric Institute and board chairman and president of Oklahoma Gas & Electric Co.

T. G. Ayers, Commonwealth Edison Co vice president, appeared with newscaster Fahey Flynn on Chicago's WBBM during the Democratic convention to tell of Housepower in the Chicago and Northern Illinois area. They also included Commonwealth Edison's 100 Plus program to help customers provide all the Housepower needed for modern appliances.

Throughout the convention broadcasts Betty Furness and Walter Brooke brought the electrical story to TV viewers for Westinghouse. Betty included appliances available to help the housewife—automatic washer-dryer combinations, electric ranges, electric fry pans, refrigerators, and freezers—and added suggestions on using these appliances to advantage. A demonstration of the slowing up of a fan due to low voltage was followed by an explanation that other appliances lose their efficiency when Housepower is low. Betty used diagrams to show how to correct such conditions by running a third service wire, adding circuits, and increasing the capacity of wiring.

Brooke told of the latest developments in fluorescent lighting and explained how industrial production could be more efficient with modern electrical equipment.

Ayers, Flynn support Housepower at local level, as . . .

Betty Furness sells modern electrical living to nation

Future Financing

High Cost Debt Money

Scheduled corporate debt issues totaling $255 million postponed because of high cost of debt money. Electric and gas utility bond issues which were postponed were:

Company	Millions
Michigan-Wisconsin Pipeline	$25
Southern Counties Gas	15
Southern California Ed	40
Consolidated Natural Gas	30

Southern California Edison Co will take advantage of the more favorable stock market and sell $26 million common instead of bonds.

No "Log-Jams"

There are no "log-jams" as yet on the fall "Financing Calendar." Utilities have scheduled only $62 million of offerings for September.

AT&T Issue in October

The $575-million common stock offering of American Telephone & Telegraph Co is scheduled for October. The other giant-sized issue planned for the fall, Ford Motor Co $250 million debentures, has already been placed.

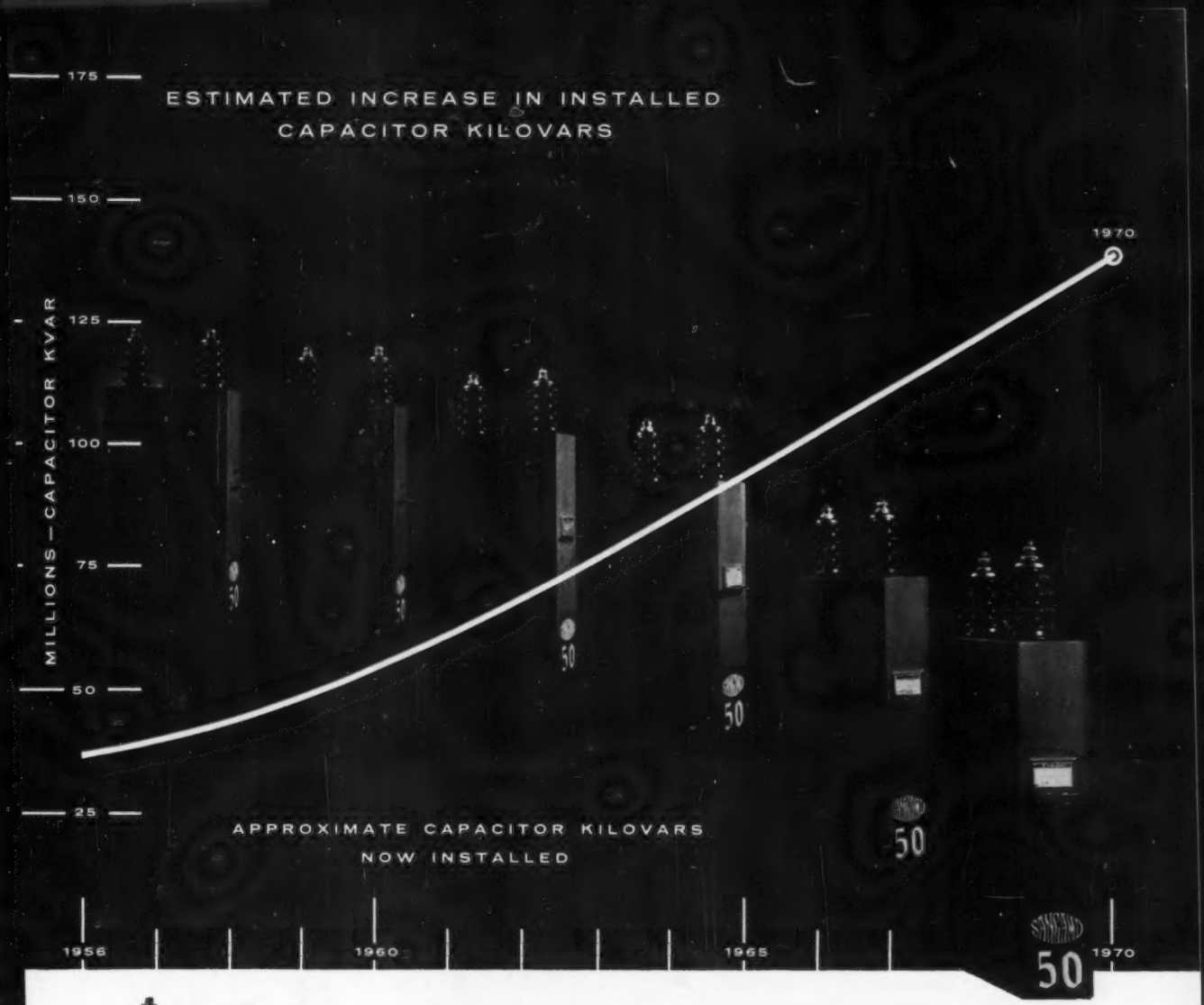
Due Diligence Meetings

Aug. 27, Tampa Electric Co; Sept. 5, Gulf States Utilities Co; Sept. 18, Virginia Electric & Power Co; Sept. 28, Columbia Gas System; and Oct. 15, Ohio Power Co.

(Furnished by the Irving Trust Co from the "Financing Calendar")

DATE AUG.	COMPANY	Amount of Offering (millions) DEBT	EQUITY
27	Detroit Edison	$59.8- -cv-rt	$
29	Tampa Electric	10.0-C	
30	New England Telephone & Telegraph		19.0- -rt COM (a)
SEPT.			
6	Rochester Gas & Electric		6.0-N Pfd
10	Gulf States Utilities	15.0-C	4.2-C COM
10	North American Aviation		50.0-N-rt COM
11	Blackstone Valley Gas & Electric		2.5-C Pfd
11	General Telephone of California	20.0-C	
12	Northern States Power	15.0-C	
19	Southern Pacific Railway	35.0-C	
25	Virginia Electric & Power	20.0-C	
SEPT.			
No Date	Pennsylvania Tunnel	25.0-C	
	Jacksonville Expressway Authority	70.0	
	Procter & Gamble	70.0-N	
	St. Louis-San Francisco Ry	61.6-R	
	City of Memphis—Power Plant	135.0-N	
	Federal Land Banks	200.0-C	
3rd Quarter of 1956 (Month not indicated)			
	California Toll Bridge	34.0-C	
	Texas Eastern Transmission		15.0-N Pfd
	Kansas Nebraska Natural Gas	5.5-P	
	U. S. Rubber	50/60.0- -cv-rt	
	Dade County, Florida	34.5-C	
	City of Dallas	40.7	
	Washington State Toll Bridge	227.0-C	
	Oklahoma Turnpike	63.0	
	Long Island Lighting		12.0-N Pfd
	Arizona Public Service	8.0-P	
	North Carolina State School	25.0	
	El Paso Natural Gas	30.0-P	
OCT.			
1	American Telephone & Telegraph		575.0- -rt COM
3	Columbia Gas System	25.0-C	
9	California Electric Power	8.0-C	
16	Public Service of Indiana	30.0-C	
17	Ohio Power	28.0-C	6.0-C- Pfd
23	Central Illinois Public Service		5.7-C
OCT.			
No Date	North-South Indiana Toll Road	220.0-C	
	Alabama Gas	7.0-P	
	Transcontinental Gas Pipe Line		7.0- -rt COM
	Florida State Turnpike Auth	185.0-N	
NOV.			
13	Metropolitan Edison	10.0	
27	Carolina Power & Light	15.0-C	
NOV.			
No Date	Transcontinental Gas Pipe Line	20.0-P	
	Long Island Lighting	20/25.0-C	
	New England Power	10.0-C	
DEC.			
3	U. S. Governments	9,100.0- -R	
DEC.			
No Date	Appalachian Electric Power	24.0-C	
	Essex County Electric	20.0-C	
	Delaware Power & Light		6/8.0-C Pfd
4th Quarter of 1956 (Month not indicated)			
	Tennessee Gas Transmission	50.0-N	
	Texas Eastern Transmission	15.0-N	
	Otter Tail Power	5.0-N	
	Northern Natural Gas	20.0-N	
	Philadelphia Electric	30.0-C	
	Southern Union Gas		3.0- -rt COM
	Columbus & Southern Ohio Electric		some Pfd
	U. S. Governments	3,000.0*	
	Central Vermont Public Service	1.8-N	0.7-N COM
	American Louisiana Pipeline		15.0-C Pfd
	Southern California Edison		26.0-N COM
	Consolidated Edison	30/50.0-C	

Symbols: C—Competitive; N—Negotiated; P—Private; R—Refunding; cv—convertible; rt—Rights; Pfd—Preferred; COM—Common. (a) Does not include amount to be offered to parent company. *Estimated.



PC56-5

Plan low-cost kvar supply with Sangamo Capacitors

The tremendous growth facing the electric utility industry, and associated economic considerations, point up the need for near unity power factor operation at peak load. Your growing requirements for Kvar supply can be met adequately and economically with Sangamo Power Capacitors.

These capacitors are designed to the specifications of power engineers throughout the country. They are built in a brand new "controlled conditions" plant—under exacting Sangamo quality control through every step of the manufacturing process. They are thoroughly tested to help make sure that their service life is long and troublefree.

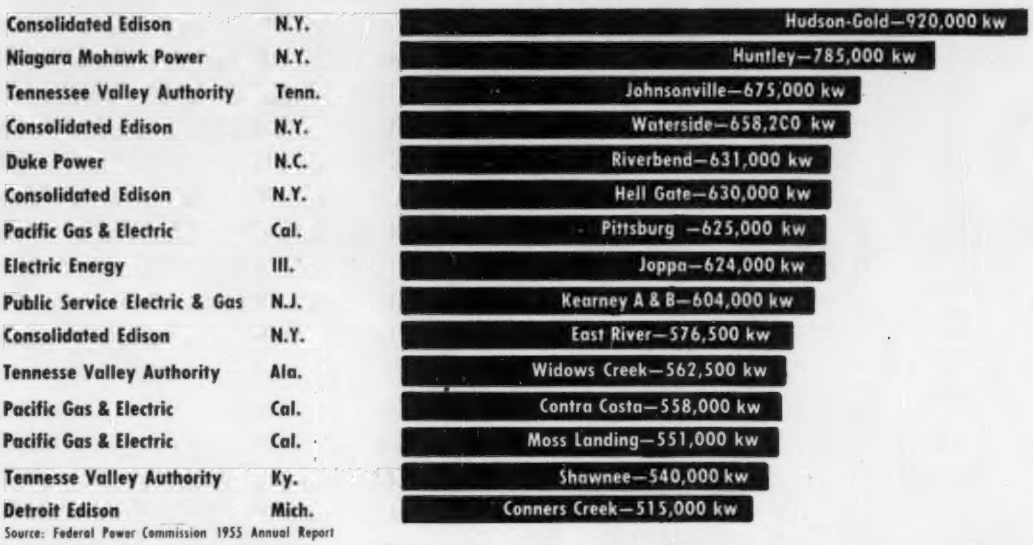
Sangamo Diaclor Power Capacitors are available in 25 or 50 Kvar ratings—of identical width and thickness—as individual units or in factory-assembled and wired Auto Var equipments for quick, economical pole top installation. All units are clearly marked to show Kvar rating. Get the full Sangamo Power Capacitor story. Ask your Sangamo Representative or write us today.

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

STATISTICS

Top 15 Steam Plants Held 9.2% of Nation's Capacity in 1954


Consolidated Edison N.Y. Hudson-Gold—920,000 kw
Niagara Mohawk Power N.Y. Huntley—785,000 kw
Tennessee Valley Authority Tenn. Johnsonville—675,000 kw
Consolidated Edison N.Y. Waterside—658,200 kw
Duke Power N.C. Riverbend—631,000 kw
Consolidated Edison N.Y. Hell Gate—630,000 kw
Pacific Gas & Electric Cal. Pittsburg —625,000 kw
Electric Energy Ill. Joppa—624,000 kw
Public Service Electric & Gas N.J. Kearney A & B—604,000 kw
Consolidated Edison N.Y. East River—576,500 kw
Tennesse Valley Authority Ala. Widows Creek—562,500 kw
Pacific Gas & Electric Cal. Contra Costa—558,000 kw
Pacific Gas & Electric Cal. Moss Landing—551,000 kw
Tennesse Valley Authority Ky. Shawnee—540,000 kw
Detroit Edison Mich. Conners Creek—515,000 kw

Source: Federal Power Commission 1955 Annual Report

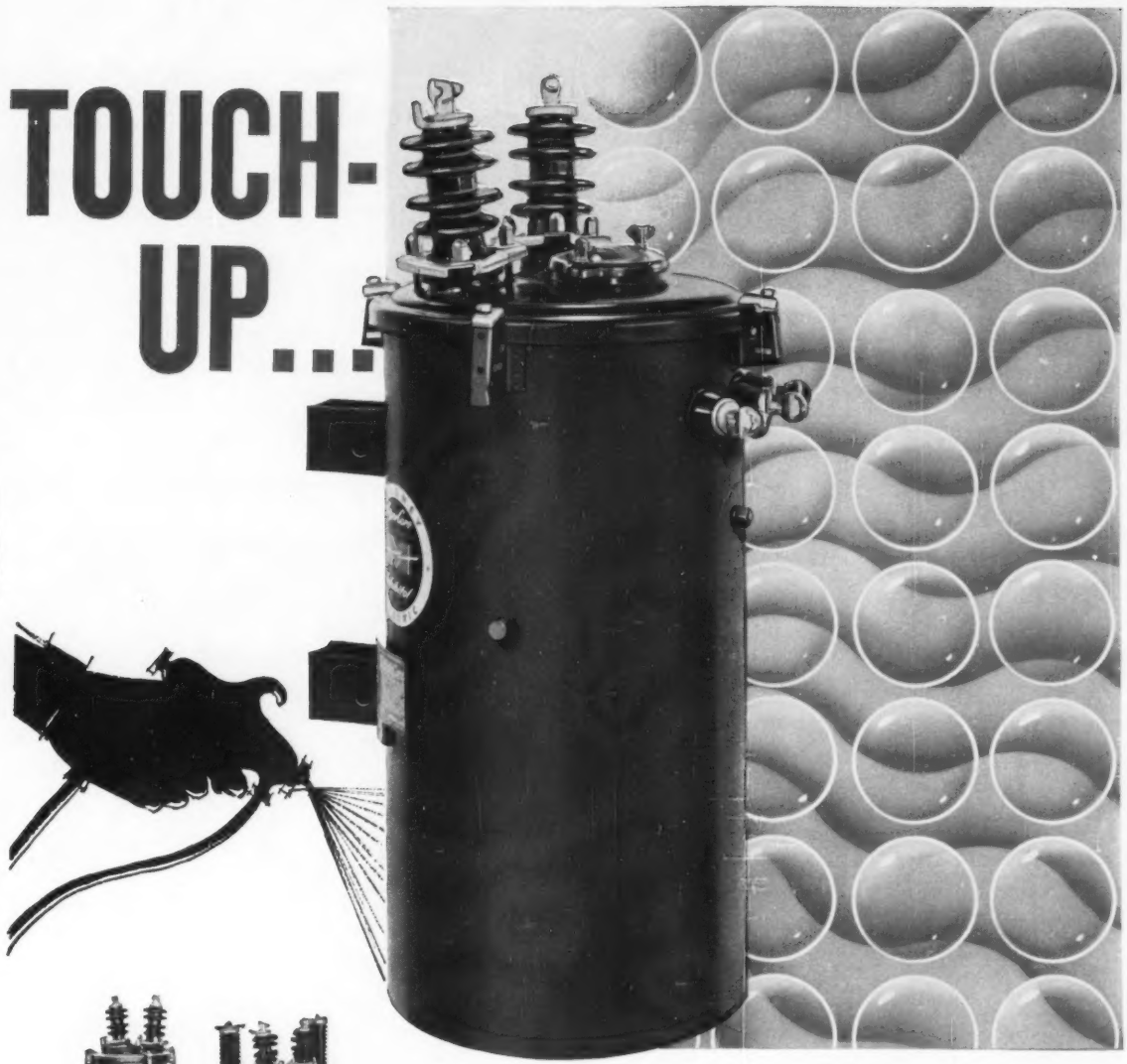
Power Statistics . . .

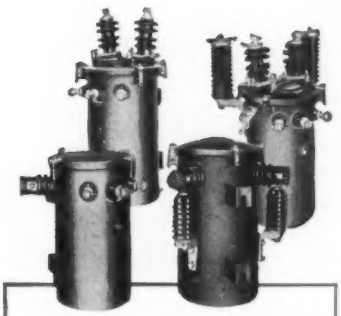
			Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	million kw	May	117.43	116.78	106.32	10.4
Peak—Class 1 Systems	million kw	June	97.00	92.6	86.6	12.0
Estimated Dec. '56 Peak	million kw	May	106.00	105.88	103.44	2.5
Production—billion kwhr		May	49.09	47.49	43.35	13.2
Hydro			11.70	11.55	9.81	19.3
Fuel			37.39	35.94	33.54	11.5
Sales—billion kwhr		May	44.18	44.51	39.49	11.8
Residential			11.02	11.82	9.76	12.9
Commercial			6.74	6.70	6.17	9.2
Industrial			24.04	23.53	21.25	13.1
Other			2.38	2.46	2.32	2.6
Fuel Consumption		June				
Coal—million tons			12.34	12.05	11.07	11.5
Oil—million barrels			4.61	4.47	4.69	−1.7
Gas—billion cu. ft			127.04	110.51	107.42	18.3
Net Income Class A & B Co's—$ million		May	103.15	115.46	92.7	11.3
Residential Customers—millions		May 31	44.87	44.76	43.63	2.8
Revenue per kwhr			2.62¢	2.62¢	2.67¢	−1.9
Avg kwhr per customer			2,858	2,838	2,637	8.4
Avg annual bill			$74.88	$74.36	$70.41	6.3

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	July	129	141	130	−0.8
ENR Construction Cost	Aug.	146.0	145.6	140.9	3.6
BLS Cost-of-living	June	116.2	115.4	114.4	1.6
NEMA Sales					
Insulation materials	June	156	158	158	−1.3
Electric appliances		106	103	118	−10.2
Wholesale prices	May				
Motors and generators		132.1	130.4	120.8	−9.4
Transformers and regulators		137.5	135.3	127.3	8.0
Switchgear and fuses		151.2	149.0	135.6	11.5
GNP—annual rate—$ billion	2nd Qtr.	408.3	403.4	387.4	5.4

TOUCH-UP...





HyperCore Transformers are available from stock in all Standard Ratings in both Conventional and CSP designs.

MEDC-10

Even Touch-Up Paint Is Sprayed On and Baked

Touch-up paint . . . when required . . . is sprayed on *every* HyperCore Transformer—*just like the original paint.*

It's baked, too, by infra-red heat—just like the original paint.

That's why dependable HyperCore Transformers have consistently uniform and durable surfaces that are highly impervious to weathering. Moloney HyperCore Transformers are *better than ever*—today—because they're products of Moloney's new and mechanized HyperCore Transformer Plant.

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers Network Transformers • Series Street Lighting Transformers • Subway Transformers • Industrial Dry Type Transformers • Capacitors • Transformers and Inductors for Electronics

FACTORIES AT 5390 BIRCHER BLVD., ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Quality Control at Allis-Chalmers

"Measuring" paint for long transformer surface protection

LIVE BETTER ELECTRICALLY

● Magnetic gauging of paint coverage is part of Allis-Chalmers way of insuring a corrosion-resistant finish on each distribution transformer. Painted tanks are gauged at several points to make certain they have the specified paint thickness when finished.

Through the Allis-Chalmers hot-spray painting process, solids percentage is increased, reducing solvent wash action on corners, increasing actual paint thickness at critical areas.

For all the information on quality control at Allis-Chalmers ... *and what it can mean to you, call the Allis-Chalmers office near you or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin, for Bulletin 61B8355.*

ALLIS-CHALMERS

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A-5045